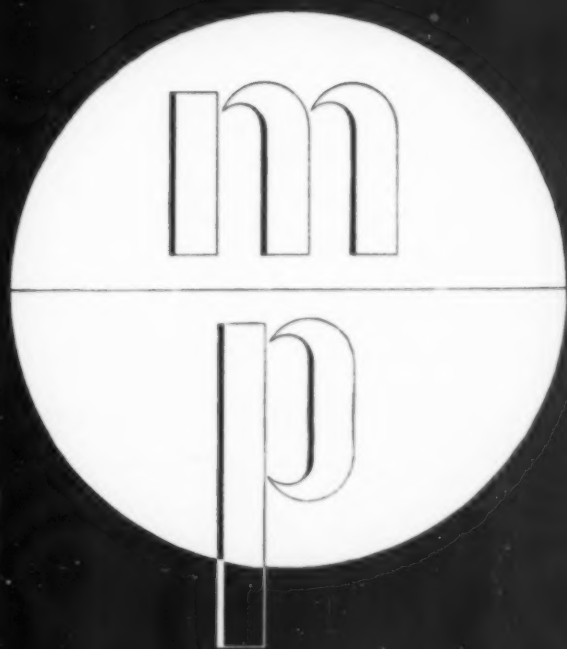


MODERN • PLASTICS



● ● ● ● ● OCTOBER 1934 ● ● ● ● ●



They eliminated

6

production operations



**AND MADE A STILL
BETTER PRODUCT**



It took nine operations to produce
a telephone bell box in metal . .

It takes three operations to produce
this one in a molded plastic

IT REQUIRED nine production operations to produce the old metal telephone bell box . . blanking, forming, trimming, grinding, sandblasting, phosphate finishing, scratch brushing, japanning and baking. And now they do it with plastic in three! Three simple operations . . molding, removing fins and buffing . . and the finished bell box is ready to ship! The molded box is light in weight — reducing shipping costs — yet tough enough to take the hardest kind of punishment. Its lustrous black finish is permanent, for it goes all the way through the material; is not applied

Far from being an exception, this bell box is only one of countless examples of the production savings this modern material has made possible.

If you haven't fully considered the possibilities of plastics for your products, why not write us today for more complete information? We'll be glad to tell you of recent developments in your field, and put our test laboratories at your service. There's no obligation at all. General Plastics, Inc., 280 Walck Road, North Tonawanda, N. Y.

DUREZ — THE MODERN MOLDING COMPOUND

VOLUME TWELVE

NUMBER TWO



OCTOBER 1934

MODERN PLASTICS

WITH WHICH IS COMBINED PLASTIC PRODUCTS

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Above Microscope molded by Auburn for Bausch & Lomb of Rochester

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Auburn Button Works Inc.
Auburn, N.Y.

Judge a molder by four things—his clients, his plant, his staff and his experience. We invite manufacturers confronted with molding

problems to inquire into Auburn's high position when judged on any or all of these important points.

MODERN



PLASTICS

BRESKIN AND CHARLTON PUBLISHING CORP.

OCTOBER, 1934 VOL. 12, No. 2

FIFTY PLASTIC PARTS NOW—HOW MANY TO COME?

USE OF MOLDED PLASTICS IN OPTICAL INSTRUMENTS
INDICATES WIDER APPLICATION MAY BE EXPECTED

By EVERETT W. MELSON

Experimental work with molded plastics has been carried on in the Bausch & Lomb laboratories for many years. It was begun with the intention of discovering whether desirable economies might be effected in parts of various instruments without lowering the rugged construction or the extremely close tolerances that form the chief planks in Bausch & Lomb's producing policy. The strains and stringencies of the depression materially affected the appropriations of both college and industrial laboratories and compelled scientific workers to check their budgets closely. With this condition known, renewed attempts are being made to achieve reduced machining costs by the introduction of molded plastic parts wherever such materials can render fully satisfactory service at a lower cost than metals or other materials which would formerly have been specified.

The result of research over a period of years is indicated by the fact that approximately fifty different pieces and parts of

optical instruments are now being made of molded plastics. Most of these parts are being made by custom molders at present. However, about a year ago equipment was purchased and molding processes in-

stalled in our plant so that we are now able to manufacture fully twenty-five percent of our molded plastic requirements. In the design of new instruments, one of the many but important considerations of the Mechanical Design and Specifications Division is, "Where can phenol resin satisfactorily replace metal or hard rubber in this instrument? And will it cut manufacturing costs?" In the smaller parts, such as binocular eyecaps, focusing knobs, pinion buttons, objective boxes and knurled



Stereo-prism binoculars with molded eyepieces showing the independent focusing adjustment and scale.



A new type of magnifying mirror which enlarges without distortion of the features. Useful to women in caring for the skin. The mounting is available in a choice of four colors. The design is by Walter Dorwin Teague. (Left)

A new reading glass of superior quality and style, with a wide field lens. This useful and attractive adjunct to the library is molded after a design by Walter Dorwin Teague.



heads, molded phenol resin was quickly discovered to be possessed of qualities of exceptional usefulness for these purposes. In the construction of instruments requiring heavy bases to insure rigidity metal die castings have an advantage over molded plastics. And where extreme accuracy is necessary in the fitted parts metal is superior because of its resistance to warp and shrinkage. Iron cores in phenol resin molds have not been satisfactory due to the different coefficients of expansion. We have, however, built microscopes with the entire stand, stage and base of molded phenol resin and found them satisfactory. The bases are usually weighted with lead to balance the weight of the instrument and give stability. The high resistance of that material to water, oil, common solvents, mild alkalis, organic and dilute mineral acids and most other reagents, gives it a very useful place in instruments designed for laboratory work. The absolutely smooth surface of the case-hardened steel molds used in the production of these microscope



The Bausch & Lomb Optical Company of Rochester, New York, have announced their new microscope produced from lustrous black phenol resin. The device is unusually light in weight, though very sturdy. Since there is no enameling to wear off, it will retain its fine appearance permanently.

Eastman's new molded Brownie camera is combined with a Bausch & Lomb microscope to form an amateur photomicrographic outfit. In addition to the camera itself, the microscope base, arm and stage are all molded parts.

stands have enabled us to produce parts of unusually high lustre, thus reducing the necessary machining operations to an absolute minimum.

Where the article is produced in sufficient volume the molds justify their relatively high cost, and while there are many instruments of a highly technical nature which might use some phenol resin parts effectively, low sales volume does not warrant the expense of making molds. In the design of our new line of binoculars, interchangeability of parts has been worked out so that not only mechanical parts but optical systems as well have a high degree of interchangeability. The eyepieces and focusing buttons of these glasses are of molded, black phenol resin. Here the interchangeability of parts creates a volume which more than justifies the expensive molds. That material also has the virtue of absorbing the black oil dye used as a surface finish. This finish is more permanent than that of hard rubber which has a tendency to fading with age and under the intensive use to which many of these instruments are subjected.

The use of molded plastic to parts of ophthalmic instruments is very considerable, particularly where insulating properties are required. On the new Loxit machine, which supplants the old wobbly eyeglass screw with a metal plug fused into the lens and strap, phenol resin is applied to the lower arm of the two jaws as an insulator. On the Keratometer, an instrument for





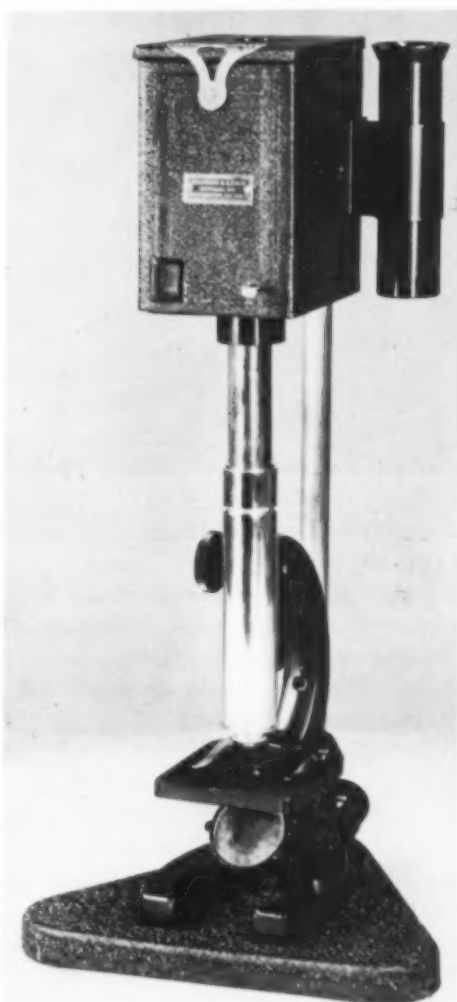
Counter card displaying the new Octagon Pocket Magnifiers mounted in Lumarith. These are made in Crystal, Marine Green, Pearl Gray and Red, Beige and Amber Mottled, Black and Cream Mottled, and Green Mottled.

A new sliding magnifier for the pocket. The lens slips out of a carrying case, obtainable in four striking colors. This mounting measures $1\frac{1}{2} \times 2\frac{3}{8}$ inches and fits easily into the masculine vest pocket or the feminine purse.



measuring the curvature of the cornea. phenol resin is used in the chin rest, the lamp house and the three focusing candles. Another instrument which requires the heat-resisting qualities of this molded plastic is the Balopticon. Here a lens focusing handle of this material has been introduced. Molded plastics, particularly phenol resin, will undoubtedly be used increasingly as Bausch & Lomb increases the proportion of molding done in its own plant and discovers new purposes it will serve. Because of the ease in shaping it; its ability to stand up under sterilization; its excellent finish, and its color, the material is satisfactory from many standpoints. There are many purposes for which its lack of weight is a detriment, but there are other purposes where its lightness is a most desirable virtue. In certain instruments, the utilization of plastics has cut the cost of machining fully twenty-five percent as compared with that of working metal.

The woodflour-filled powder is the type of material most used. It has an adequate flow in the mold when subjected to heat and pressure and greater toughness than the pure resinoid. The steel molds in use here are given a steam pressure of about 60 lbs. and a hydraulic pressure of approximately 1,400 lbs. per square inch. The parts ordinarily require an average of ten minutes to harden. Experiments made with a mineral filler, such as asbestos, indicate that while the material is stronger and the heat and water resistance greater, a de-



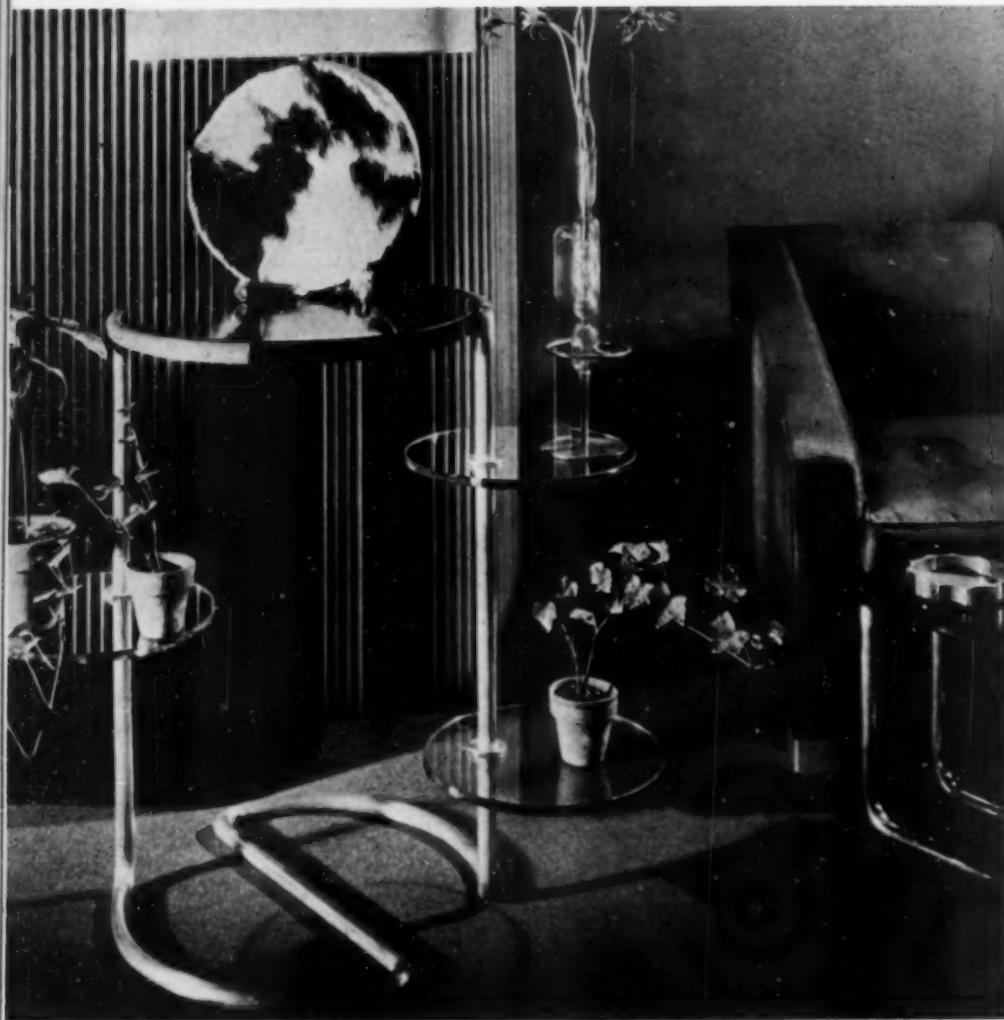
A new amateur photomicrographic outfit in which the Model R microscope has a molded stand, stage and base. At the right of the camera is the focusing tube of molded plastic.

Plastic moldings are particularly suited for use as hand operated parts on delicate optical equipment. The adjustment wheel on the machine shown at the right was molded to better withstand wear under trying conditions over a long period of time.

sirable finish was not obtained due to the fact that bits of mica in the surface would not absorb the black oil dye.

In addition to phenol resin, cellulose acetate is also serving a useful purpose in the optical instrument industry. Bausch & Lomb has found this material excellent in the designs created by Walter Dorwin Teague for handles and frames of magnifiers, readers, and other small optical specialties in which women as well as men are interested. The transparent, mottled, and opaque effects offer an unlimited choice of novel and attractive color combinations. The high elasticity of the product makes it possible to force lenses into a cellulose acetate frame without damaging them. At present this material is chiefly used on the more expensive and important optical specialties, although extensive experiments are now being conducted with a view towards determining the possibilities for wider application among less costly items.





Penthouse or plant stand with top of black Formica set into solid tube aluminum base with three movable shelves of half-inch plate glass. Designed, originally, for Professor Charles Hodges, of New York University

IN THE FIELD OF

AN HOUR WITH

By E. F.

"Predict the future of plastics?", repeated Mr. Sanders in answer to my query, "Never! It's too big an order."

"I'll say this," he continued, "there is no question, plastics have definitely established themselves as an important industry and their future holds illimitable possibilities."

"In what direction?" I asked.

"In every direction its manufacturers will exert their efforts, and this is largely a matter of education," he replied.

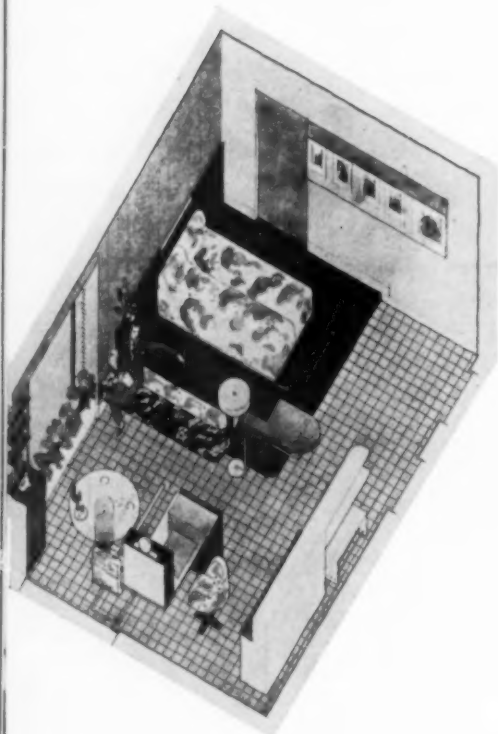
"We must remember that plastics, themselves, are decorative materials with their own birthright of beauty and adaptability. They need *never imitate!*"

"Plastics lend themselves importantly in the field of decorative design, yet their development up to the present time has been largely in industrial uses by replacing materials like vulcanized rubber, for insulating purposes and electrical equipment. More recently they have found a definite place in the packaging industry where new uses for them will be constantly found. There is no doubt about their advantage as closures for certain types of tubes and bottles. People like them because they are decorative and convenient to use. And when I say people, I mean the You's and I's, and our friends, and their friends, to whose desires and demands we must bow if we create to sell and hope for any general acceptance of our products and our ideas.

"Through their convenience and decorative treatment in these commonplace industrial uses, plastics have become well known and favorably received. It is logical, therefore, to develop their broader uses in the field of decorative design.

"This must be done carefully. Badly handled, plastics present a 'cheap' appearance. Imitation wood-grains and marble-veins have no place in plastics if they are ever to attain the high position they merit in this field."

Mr. Sanders cited the first all-steel railway coaches as an example. When they first appeared they were elaborately grained to imitate wood. It was thought the



Isometric sketch of the interior of a man's combination bedroom and study. Window walls are natural Bakelite, contrasting in delightful relief with the plaster white walls opposite

black
with
glass.
Charles

Combined radio and utility cabinet with black Formica doors, white plastic hardware, and Brazilian rosewood base. From the home of M. Jean Despres, executive head of Coty & Cie.

OF

DECORATIVE DESIGN

WITH
E. F.

MORRIS B. SANDERS, JR.
LOUGEE



ever!
shed

public would demand it. Now they obtain beauty and dignity through the use of plain lacquers and the improvement is obvious. Automobiles, in the early days, tried hard to look like the buggies they hoped to replace, but those who first discarded this idea and made their cars look like cars stepped rapidly ahead.

atter
own

"For one thing," he continued, "plastics can be popularized in the manufacture of furniture, and here is a field that has scarcely been touched. It has tremendous possibilities!"

own

"Will modern furniture ever become popular?" I asked boldly. I knew what to expect, and got it—a withering look of scorn.

lop-
rials

"Modern furniture, young feller (and he is fifteen years younger than I) is definitely here to stay! Its comfort, beauty, and livability assure it. And there is no finer material than plastics for table tops, lamp bases, desks, cabinets, bookshelves, bar tops and game tables for the game room, coffee tables, plant stands, and a thousand and one other things that make a house or apartment a home.

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"They are especially suited for table tops and cabinets in children's rooms where finger marks may be easily removed. And for out-of-doors furniture when the edges are properly sealed. Lacquers may be obtained to match their colors for painting the woodwork with which the plastics are combined, and for painting curved surfaces with short radii where it would be impossible to bend plastics to fit.

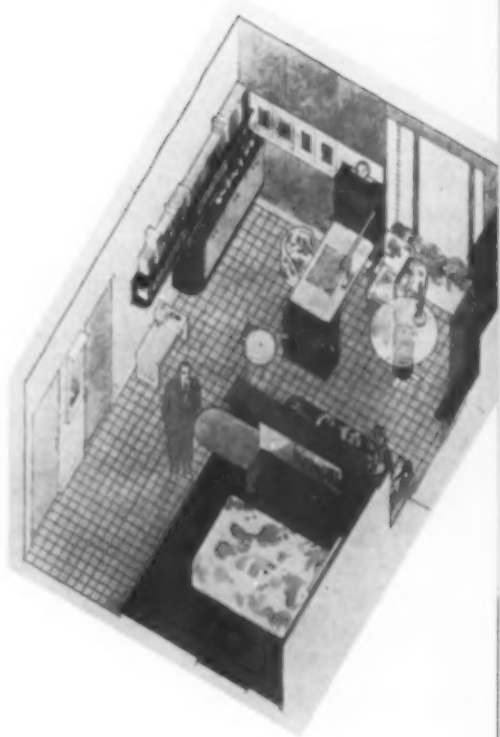
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"The dull finishes are best. Plastics inlay beautifully, and combine well with aluminum and other metals in making fine furniture. Combined with rare woods, there is nothing more decorative than plastics for creating distinctive pieces for the modern home.

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o at-

"And they need not be limited to the home! They lend warmth and richness to the decorative scheme in offices and showrooms as well. I have used them in many such places with equal success.

they
the



Another view of a man's combination bedroom and study. An ingenious arrangement of plastics, glass, and metal is indicated for the furniture and bookshelves

N



Corner in the millinery showroom of Mme. Lilly Dache, where the shelves, table-tops and cabinets are of white Micarta and black Formica against walls of soft yellow spun glass. The curved end of the cabinet is of Formica backed with galvanized sheet iron which allows it to be bent on reasonable radii. The wall plaque is carved in cork

"Plastics are pretty expensive for any general architectural use at present, but they have their place and are being used. Asbestos backed plastics, for instance, are available for fireplace facings and wherever used, give greater charm than marble or tile, and are more easily installed. Plastics are ideal for radiator coverings, especially where one wishes to grow plants on top. The dull lustre of plastics excels for wall paneling in kitchens and bath rooms, and on occasion, for living-room panels.

"Restaurants, bakery and candy shops should use plastics to advantage for counter tops and wall panels. They are clean and sanitary and easily kept that way and present a permanent feeling of freshness and prestige.

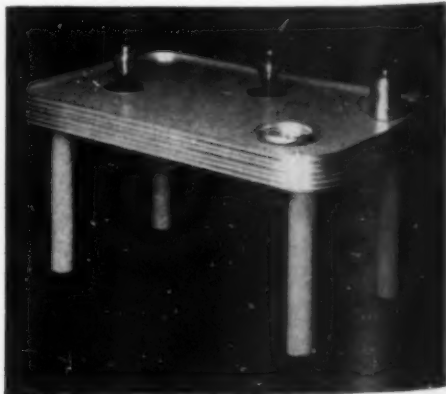
Modern muffin stand of white Micarta and aluminum topped with a ball of clear crystal

"When plastics are built up to their true value in the minds of people both inside and outside the trade, and developed as a thing of quality with a beautiful surface unmatched by other materials, they will take their comparable place with ebony, glass, and aluminum in the decorative design field.

"Right now, their development is almost wholly along the lines of substitutes and replacements. They are made into inexpensive things and there is good reason

for it. But with progressive development as a decorative material of value in itself, there will be greater desire to possess things made from plastics for the joy and beauty their possession can give. Fine boxes, trays, and other novelty merchandise constructed with plastics will find greater acceptance. These materials will become increasingly useful

Coffee table with Formica top and extruded aluminum edge. Legs are of solid wood lacquered to match the top





in the packaging field. Plastics, in fact, can become the super-package for the protection of finer merchandise such as perfumes, powders and jewelry, and occupy a prominent place in exclusive shops—a thing to be desired for itself.

"An educational campaign directed to the trade as well as the public would shorten the route and the time required

Fireplace of asbestos-backed white Micarta and metal. The fender and andirons are of aluminum



for plastics to succeed in the design field. Experimental laboratories could create models to show new uses, and cooperate with designers in advancing their own ideas. Exhibitions of modern furniture in which plastics become an essential part could be arranged to educate the public, much as packaging shows are arranged for the benefit of the trade. The cost, perhaps, would be greater than the immediate return but the prestige gained could not be measured in dollars and

Customer's try-on table in the Dache showroom, of white Micarta top in which squares of frosted white glass are set flush, and lighted from beneath to give auxiliary frontal lighting with the overhead tubular fixture. The modern Duncan Phyfe table is of white Micarta on wood pedestal with aluminum legs

cents. Results and tradition prove such efforts are worth while.

"Perhaps some manufacturers of plastics are already doing this. I don't know, but if they are, more power to them!"

Mr. Sanders is one of the younger contemporary designers who has gained much valuable experiences handling and combining ordinary materials for uncommon uses. His work as an architect is better known than his work as a designer due to the fact that for several years he "ghosted" for prominent decorators.

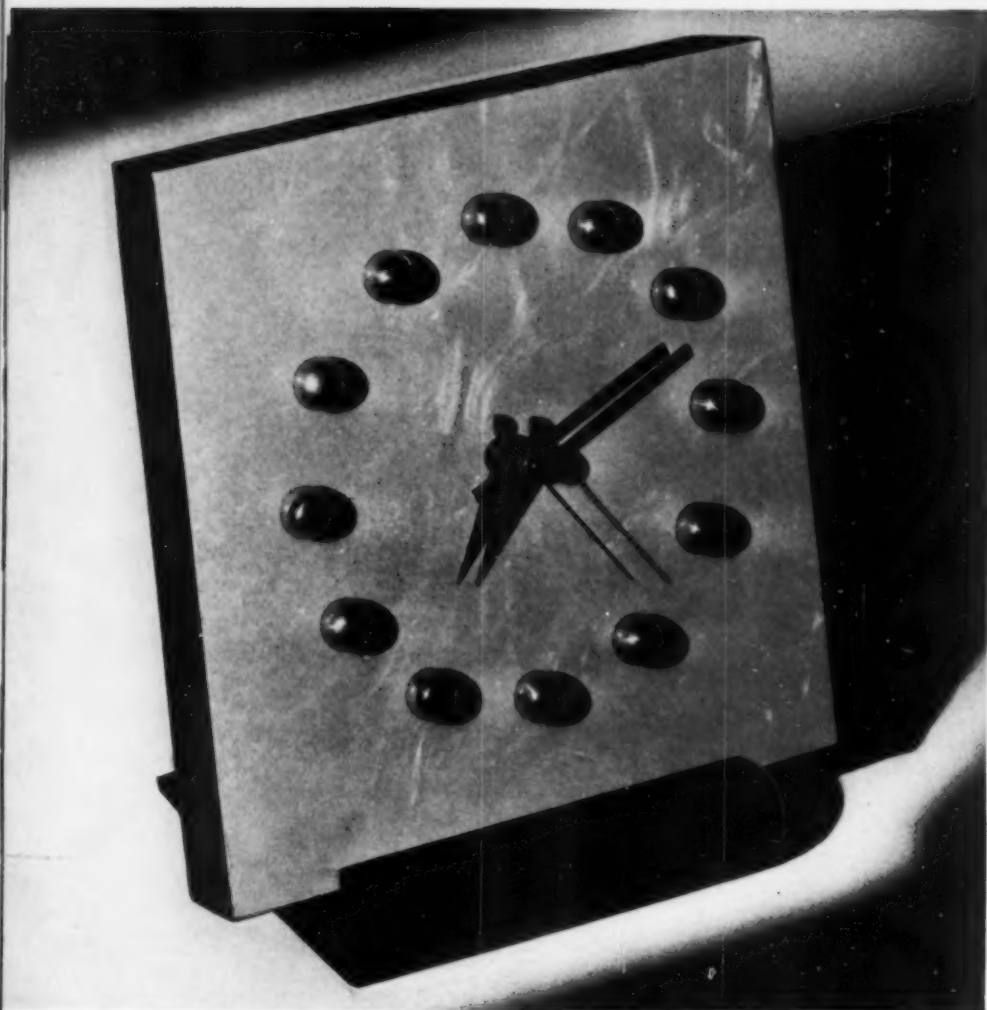
He came out of Yale with two degrees, Ph.B., and B.F.A., then rushed off to Europe to study art. He became interested in architecture and traveled pretty much around the globe studying it.

When he returned to America and took

(Continued on page 64)



Morris B. Sanders, Jr., Architect, Decorator, Designer and proponent of plastics



SUCCESS STORIES

BEING CASE HISTORIES OF PRODUCTS UTILIZING PLASTICS



Product: Electric Clock
Manufacturer: Herman Miller Clock Company
Designer: Gilbert Rohde
Engineering Design: Design Division, Herman Miller Clock Company

DESCRIPTION AND DESIGN: The World's Fair has brought twenty million people up to the times in a thousand different respects. But it was especially interesting to the Herman Miller organization to learn, by careful observation at the Fair itself, that people liked to keep up with the times with clocks designed in the modern manner. Manufacturers had hesitated to plunge into large scale production of this "luxury" item, believing that depression-thinned purses would not open for it. However, the fact remained that the exhibit at Chicago was drawing thousands of strollers. When at last the additional

information came that rural and city dwellers were alike in the interest shown the new type models at the Fair, Miller decided to act. Heretofore, clock manufacturers had always thought their market to be chiefly a metropolitan one.

MANUFACTURE AND MATERIALS: Gilbert Rohde selected gray Formica to interpret the note of modernity in one of the clocks of the series. Simple forms and sweeping lines have been used to realize elegance and simplicity. Polished chromium balls are used in place of numerals. The hands are black as is the molded plastic base. With all its modern touch, a good old-fashioned alarm is still part of the clock. A second hand is also incorporated to verify the electrical movement. The same basic design is used for two other compositions—Micarta and pearl Celluloid.

SALES SUCCESS: The entire line has been highly successful and the sales reports corroborate the findings of the research division and statisticians at the Fair. Sales are well spread in both the large metropolitan areas and the smaller communities. Surprisingly, the smaller shops in the small communities have not only sold the clocks well but, if anything, have on a percentage basis beaten the results obtained in the major areas.



Product: Gas Range
Manufacturer: The Floyd-Wells Company
Consultant Designer: Walter Dorwin Teague
Engineering Designer: The Floyd-Wells Co.

DESCRIPTION AND DESIGN: In redesigning the Deflector Model for the Floyd-Wells Company, Mr. Teague had to keep in mind the fact that gas ranges on the whole are not only well designed, but are far in advance of most household appliances in appearance. So, in addition to attempting to further improve a standard which is already high, certain mechanical advantages had to be incorporated which would give the sales force compelling sales points in their selling of the stove. To achieve both of these ends, Mr. Teague designed the model pictured and incorporated in that design the mechanical advantages stressed under Manufacture.

MANUFACTURE: The finish is of cream enamel with handles of molded plastics. The handles are so placed as to be always visible and accessible even when the doors are in a horizontal position. The covered manifold panel invented by Mr. Teague completely encloses the molded plastics control board—there is a similarity to automotive control board. As one can see, this is a distinct contribution to safety as well as appearance. The instant-opening cover keeps gas controls out of the reach of children and helps to keep the cooking top immaculately clean. The gas cocks themselves are located below the manifold—well out of range of the heat zone. When closed, the manifold cover is an integral part of the general design. The illustration shows the manifold cover open and folded out of the way, exposing the gas cocks for use. Besides the manifold

panel mentioned, the "Detector" has many other outstanding features:

Hi-Low Burners. These provide the right temperature for every cooking need from flaming heat to the merest warmth; perfect heat distribution on a smaller consumption of gas; elimination of scorched vessels and burned foods due to excessive heat; openings that cannot clog or corrode; parts that are easy to remove and clean.

Unusual Ruggedness of construction throughout. The range is built upon a cast iron framework, similar in durability and structure to the chassis of an automobile; its legs, front-side rails and cooking top are all cast iron, of exceptional strength and stamina; it is also reinforced wherever necessary to keep it in service years beyond the life expectancy of the normal gas range.

Hand-Level Broiler. Constructed like a filing cabinet with a special aluminum pan that can be pulled in or out to inspect, prepare or remove the contents at any time. Distinct and separate from the baking oven, the broiler compartment is placed at a level easily reached without kneeling or bending.

SALES SUCCESS: Very wide. Furthermore, the new stove is so good-looking and has so many attractive features that it has been used successfully to open up new dealer outlets for the company. It is by no means the lowest priced item in the line, and as a de lux model has succeeded. The company feels well repaid for the sales efforts interjected into it. The consumer already educated to the fine points of good gas range design finds in this model not only the appearance factors that he expects, but in addition certain soundly designed and basically important engineering factors presented in a simple and striking way. These engineering factors are a decided asset to the dealer in demonstrating and selling the stove.

★ ★ ★

Product: Ignition Coil
Designer and Engineer: M. Mallory

DESCRIPTION: The new Mallory Model 100 coil shown in the foreground is designed for all internal combustion en-

gines, motor-car, truck and marine. Brought out as an addition to the Mallory line of coils, the Model 100 is said to meet more closely the ignition requirements to today's high-compression, high-speed motors, preventing burned out contact points and excess current consumption due to a too short saturation period. Another objective was to produce a truly waterproof coil and to prevent formation of carbon-tracks, a common coil weakness.

To accomplish these things, Mr. Mallory felt that a radically new shape would have to be used in order to separate the

hot terminal from the primary terminals and prevent arcing, and to shed water effectively in any position. As can be seen, the secondary or "business end" of the coil is rounded smoothly, and a rubber gland fitting into a recess in the special arc-resisting plastic terminal plate replaced the customary molded peak on the ordinary coil. This makes the coil so waterproof that it can actually be run while the secondary and the case itself is submerged in water.

MANUFACTURE AND MATERIALS:
The use of molded plastic material for



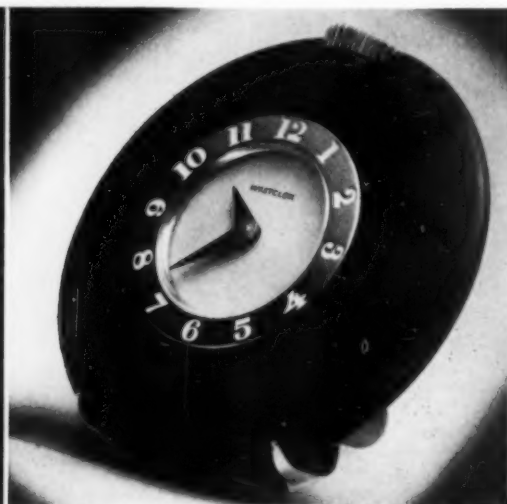
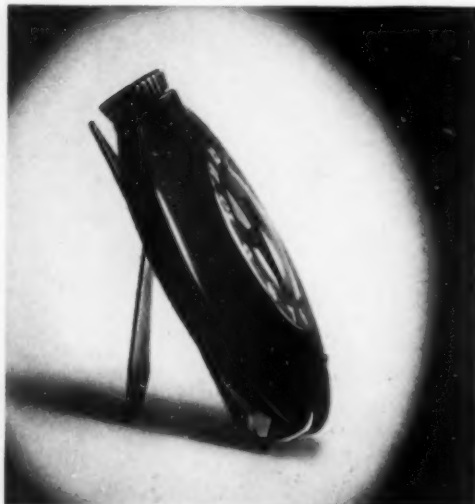
coil cases was pioneered by Mallory, for reasons of "insulation, appearance, low thermal conductivity, and a finish which would not chip off and permit rust and corrosion." In the original molded-case coils, such as the one in the background, the cases were rather heavy and difficult to mold. But in the latest model the case is made lighter, straight-drawing and more compact. Three pieces are used: the case proper and the primary plate being molded of black Durez, while the smaller hot terminal plate uses a special material to prevent carbon-tracks and fatigue breakdown.

Another feature is the inner shell which fits into the case—being a part of the molded cover—and which supports the core and acts as a cushion mounting to absorb shocks and vibration. It can be seen in the cutaway view, and illustrates how proper handling of plastic materials can combine related parts ordinarily made separately, thus securing a less costly, more compact and efficient assembly.

SALES RESULTS: Mallory executives describe the sales record of the new-type coil as "excellent," but since it does not specifically replace another model, no sales increase in percentage can be obtained. The Mallory organization attributes its success to its radically new design, and to the fact that it embodies several new and patented performance features.

★ ★ ★ ★

Product: Westclox Handbag Watch
 Manufacturer: The Western Clock Company
 Design Consultants: Industrial Design, Inc.
 Engineering Design: Design Division, The Western Clock Company



Molded plastic material and a radical, truly-functional shape erase all apparent similarity between the new Mallory ignition coil in the foreground and the conventional coil. The shape is to shed water; the molded case for insulation and appearance.

DESCRIPTION: Investigation showed that to the powdery disarray of the modern lady's handbag a graceful and decent-sized watch would be a welcome addition. Women were carrying large, but cumbersome watches whose distinction did not rest in their good looks. On

the other hand, tiny watches were easily lost, or suffered breakage by contact with metal accessories.

Ideal size and style had been present in the famous Arden "pancake" compact which had been introduced some years before. The designers rubbed the lamp—and with what good results, you see on this page. Besides being a useful and attractive gadget for everyday use, the watch has an easel that makes it a clock for boudoir or hotel rooms.

MANUFACTURE AND MATERIALS: All present cases are black and are molded of phenol resin. The gold plated numeral band which fits by pressure against the gleaming black is another reminder of this sure-fire combination and the numerals of white enamel complete a picture of rich simplicity. In the notch reserved for it, the gold plated winding stem rests snugly where it will not catch at handkerchiefs or disturb the symmetry of the case.

(Continued on page 64)



LAMINATED PLASTICS MAKE THE "FIREPROOF" SHIP A REALITY

By ALBERT QUINCY

In August, 1930, the Morro Castle, pride of America's shipyards, made its maiden voyage. She was in every respect a modern ship. The double bridge and overhanging promenade deck, the sun deck, bridge deck, shelter deck, upper deck and lower deck, all were of steel. All deck houses, all companion hoods and enclosures, skylights, domes, etc., were of steel. Steel could hardly have been used more lavishly—yet today 137 men, women and children are dead or missing as a result of the disastrous Morro Castle fire!

It is deceptively easy for post mortem critics to say, "There ought to be a law enforcing fireproof construction throughout all passenger ships." But the burning of the Morro Castle, though it may have served to emphasize the need for fire-

proof construction, must not be construed as an indictment of the engineers and architects who were responsible for the original planning of the ship.

The hazards of fire have always furnished a major problem in the construction of ships. Engineers, marine architects and ship owners have for many years paid a great deal of attention toward the elimination of inflammable materials, the introduction of fire-resistant and fireproof materials. The very fact that during the ten years ending in 1931, over sixty-two million dollars of fire loss to cargoes and vessels was suffered by shipping, serves to show the seriousness of the problem. And just because this problem proved so serious in a monetary way, it is certain that shipbuilders and ship owners have always had a strong desire, at the least, to minimize fire hazards.

How, then, could a disaster so vast as that of September 8th have occurred?

The answer will be found in the fact that in spite of the introduction of fireproof or

The Manhattan—first of the Plastic Fleet—leaves on her maiden voyage. Ahead of her day, when built, she is already out of date in fire-resistance. New ships would carry ten times her quota of Plastic paneling.

fire-resisting materials in the construction of hull and super-structure, the most dangerous portions of passenger ships, the passenger quarters themselves, are still constructed of highly inflammable wood.

All exposed decks on the Morro Castle were laid with caulked wood. The deck ballroom, the veranda cafe, the promenade and the inside bulwarks were panelled in teak. The lobbies and public rooms were elaborately finished in mahogany, satinwood, ebony and rosewood. The smoking room was executed in walnut. The de luxe suites on sea deck had hardwood and painted wood bulkheads. Staterooms likewise were provided with wood bulkheads and furniture.

Thus, in spite of steel framing, the passenger quarters and public rooms of the Morro Castle were not merely subject to fire but were so constructed that a strong fire, once started, was almost certain to spread throughout the ship!



At first glance, it would seem curious that engineers, aware of the need for fire-proofing, should so plan a vessel. Yet, it must be remembered that two factors govern the decoration of the public rooms and staterooms of a luxury liner.

The first is that of weight. It is necessary that the upper decks of a steamship be as light as possible to preserve the stability of the ship. It is likewise considered essential that the materials used in constructing the public and private rooms be subject to decorative treatment of a high degree, that they be pleasant to the touch and pleasing to the eye. Therefore, while such fire-resistant materials as steel and the plastic group were in existence prior to 1930 (the year of the *Morro Castle's* construction) it can well be understood that they were not in a sufficiently developed state to justify their use at that time.

The argument as to whether they should have been used or not is a futile one. The essential point today is whether ships now being built or yet to be built can be so constructed as to achieve the essential decorative beauties, the all-important lightness of weight, while at the same time providing a degree of fire retardation infinitely greater than that which has to date existed.

Let us examine a few of the materials which have in the past been proposed and rejected. The use of steel has, of course, suggested itself to marine architects. The eminent naval architect, George G. Sharp, has used steel with remarkably fine results on the public rooms of four of the vessels of the American Scantic Line. Yet steel—and for that matter such other metals as brass, copper and aluminum—are ill-suited to use in private staterooms and in many public rooms because of their metallic ring and their cold metallic feel. It is a fact that passengers deeply resent being placed, for even the short duration of a cruise, within the confines of what they term "a tin bread-box."

It is likewise true that bare metal is subject to rapid deterioration unless labo-

"SS *Washington*" boasts plastics paneled public rooms, state rooms. Above, "B" Deck Foyer—Below, Smoking Room. Note richness of detail attainable with plastic wood-veneer materials.

riously painted. Such painting can be done continuously on the hull and exposed super-structure of a liner but the highly surfaced decoration of interior rooms must be more lasting or it would be necessary for the ship to suffer frequent layoffs from its regular run.

These same elements of surface-beauty and surface-life have played an important role in the rejection of other materials. It can be accepted that no material which does not present a lasting, highly decorated surface can hope to achieve extensive use in the interior structure of passenger carrying vessels.

What, then, is to be done?

Until a few years ago there would have been no answer. Yet, almost as if invented in anticipation of the Morro Castle disaster, there are today a host of plastic materials highly developed and thoroughly suited to the requirements of the marine architect.

Until recently, it was felt that the use of laminated plastics would entail a prohibitive cost. Yet architect Sharp, in discussing the need for fire prevention and control, has estimated the increased cost of building a passenger vessel according to the standards of fire resistance established by the National Fire Protective Association at approximately 1 per cent.

Mr. Sharp was not talking of laminated plastic materials exclusively. Yet it can be confidently said that the statement would apply with equal (if not greater) truth to the plastic group than to any other proposed material. In fact, among plastic engineers who have been working on the problem, the feeling is general that the mass production of plastic-treated materials (which the near future is more than likely to see) will so reduce fabrication costs as to make possible the use of such fire resistance materials *without the expenditure of a single additional penny!*

The plastic surface materials offer two other distinctive advantages when costs are considered. Obviously, an average fire loss of six million two hundred and fifty thousand dollars implies a commensurately high fire insurance rate. Such occurrences as the Morro Castle fire imply an inevitable increase in the cost of fire coverage. The use of fire-resistant materials will find initial cost immediately compensated for by a lowering of insurance

rates, and this compensation will endure throughout the life of the ship.

Likewise the enduring surface which plastic materials offer makes possible a pronounced reduction in decoration maintenance costs. Whereas today all passenger quarters are subject to frequent re-decoration because of weather deterioration and the effects of hard treatment by passengers, the plastic materials provide a far longer useful life.

Ask any deck steward how much alcohol can spill on floors and walls and furniture. Ask any maintenance engineer how frequently it is necessary to re-decorate and repaint stateroom bulkheads and you will appreciate the importance of a material which is highly resistant not only to fire but to alcohol, acids, foods, alkalis and those articles which passengers seem to delight in throwing at their stateroom walls.

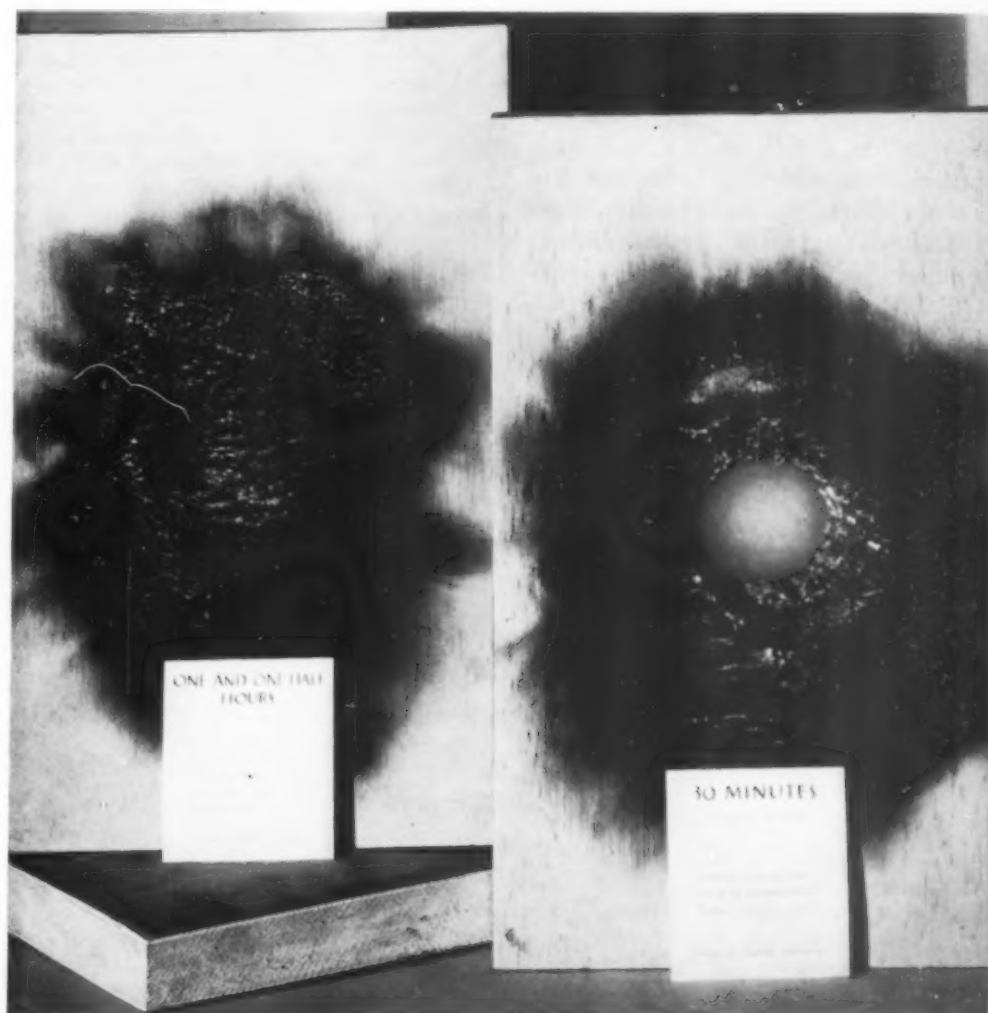
It is thus apparent that the use of the plastic group of fire-resistant materials will not only entail little or no extra expense when the ship is built but will likewise provide definite operating savings throughout the useful life of the ship.

Several instances already exist in which plastics have found extensive application on shipboard. Molded door handles, kick plates, escutcheons, baseboards, electrical equipment, etc., are, of course, just as frequently made of plastics on shipboard as on land, and these uses, in both instances, are rapidly increasing.

Whereas old-fashioned brass doorknobs and switch plates were subject to rapid deterioration in the fog and damp of sea-going life, it requires little or no care to retain the lustrous finish and attractive appearance of such articles when they are molded of plastics. They cannot tarnish or stain. There is no plating to wear off. The color goes all the way through, not just on the surface. Lastly, these products are not only in keeping with modern decorative ideas but provide an exceptional degree of durability, strength and resistance to sea air.

Likewise the construction of shipboard furniture has, in recent years, involved

The blowtorch tells the story. At left, a Haske-lite panel which has withstood an hour and a half of 1800 degree flame. At right, ordinary plywood—passing the fire on in 30 minutes.

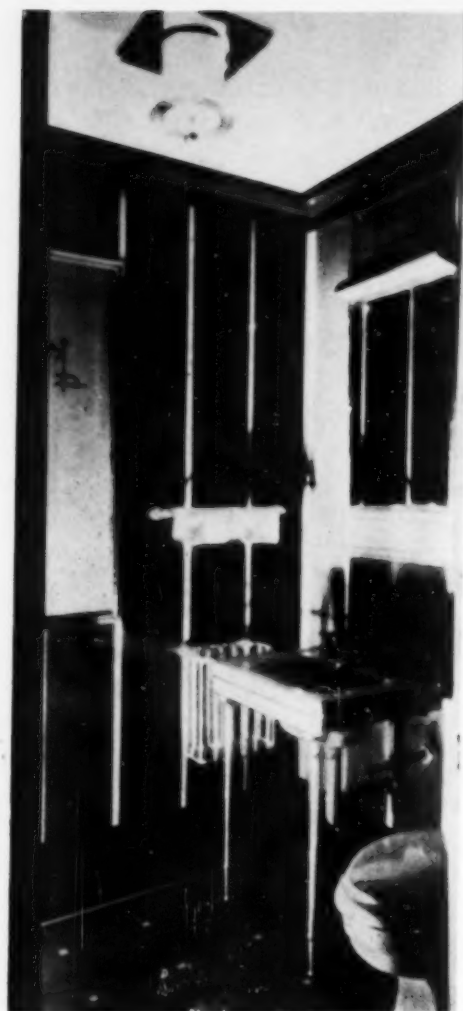


the use of laminated plastics on bars, desks, cabinets and tables. Here the purpose has been both to provide greater resistance to wear and abuse (and particularly resistance to the fire hazard presented by burning cigarettes and spilled liquors) and at the same time to make possible truly modern decorative effects.

These instances of use are due for a pronounced increase as architects become more acquainted with materials available and develop further the possibilities for their interesting treatment. Yet, in themselves they are but foretastes of the more important constructional uses of plastics.

The actual use of laminated paneling in the construction of public rooms is probably best known by the work that has been done on the steamships Washington and Manhattan. Here the New York Shipbuilding Company and the United States Lines have utilized over six hundred fifty thousand square feet of Haske-lite-Phemaloid, a plywood panel made up with phenol formaldehyde resin. This type of panel owes its fire resistance to the incombustible resin ply placed immediately under a very thin face-veneer. Fire tests conducted by the Robert W. Hunt Laboratories have shown a very high degree of fire resistance, ninety minutes exposure to gas torch flame having failed to penetrate through a test section .887 in. in thickness. A similar exposure of an ordinary plywood panel of equal thickness for a period of only fifteen minutes has resulted in full penetration of the flame through the board.

Thus, while a hot fire would, of course, destroy the surface of such a panel and require re-decoration or even reconstruction of the room, it would be extremely unlikely for the fire to penetrate and pass into adjoining rooms. These



A bathroom and a de-luxe stateroom on the S.S. Scanyark, both decorated in laminated Bakelite paneling with wood grained finishes. Since wainscoting, walls, baseboards and door-trim are fire-resistant, passengers can drop cigarettes to their hearts' content. Important also: they can spill drinks, kick walls—without effect.

Phemaloid panels are constructed with Balsa Wood and are thus extremely light in weight. Their veneer facing makes possible decorative effects identical to those which may be achieved through the use of wood alone. Haske-lite, in remarkably fine decorative effects, has been used throughout the Washington and Manhattan for bulkheads, doors, ceilings, fire doors and frames, as well as for extensive stateroom decoration.

Bakelite laminated panels have likewise achieved extensive use in stateroom construction, notably on the S. S. Scan-States where de-luxe staterooms have been furnished with walls, baseboards and door trim of Bakelite laminated in wood-grain finish. Similar installations have been made in staterooms on the S. S. Scanyark.

Other installations of laminated plastic paneling manufactured by various lami-

nators have been made on a number of other ships and it is significant that there exist more than eleven manufacturers who have developed laminated boards suitable for one or more uses on shipboards.

The Formica Insulation Company possesses a wide range of boards which have achieved extensive use on shipboard as well as tremendously wide usage in comparable land construction. Formica paneling is being used in considerable quantities on the new Cunard-White Star liner, Queen Mary, in which case Formica is veneered to high grade mahogany plywood. While it is thus not, strictly speaking, utterly fireproof, it falls within the fire resisting class.

The Formica Insulation Company also manufactures three other types of paneling particularly suited to shipboard use. Formica applied to metal and Formica applied to asbestos provide, of course, utter freedom from the possibility of combustion and thorough resistance to the transmission of fire from room to room. Formica likewise has been applied to Presdwood, in which case a fire resisting and extremely



low burning board is achieved. Such Formica boards can be obtained in a wide range of decorative effects including flat tones, marbles, wood finishes and metal inlays.

Likewise the Westinghouse Electric and Manufacturing Company, in their Mica-carta, have a highly fire-resistant panel suited to the needs of the marine architect. So, too, such materials as Lami-coid, Synthane, Panelyte, Textolite, Di-

PLASTIC LAMINATORS

Continental Diamond Fibre Company
Formica Insulation Company
General Electric Company
Mica Insulator Company
National Vulcanized Fibre Co.
Panelyte Corp.
Richardson Company
Spaulding Fibre Co.
Synthane Corp.
Taylor and Company
Westinghouse Electric and Manufacturing Company

Not a ship—but another illustration of the possibilities for achieving decorative effects with wood-surface plastics-paneling. Here in Radio City's theatres, Haskellite has been used in the modern manner—could have been used in any desired period style.

lecto, Phenolite, Spauldite and a number of others are available in the laminated sheet class for use on shipboard.

At another point in this article will be found a list of the principal manufacturers of laminated boards of all types.

One more type of material has recently been developed which is particularly suited to marine constructional needs. This finds its base in the invention of Dr. Coffman of the Mellon Institute of Pittsburgh, known as Bonded-Metal. Here a means has been found for providing a permanent bond between light weight metal sheets and a fibrous material which may be felt, asbestos or fabric. This Bonded-Metal sheet, with a fabric surface, is used in creating a laminated-sheet of extremely high surface and highly resistant to fire. In the case of plain-surface sheets or marbleized finishes the plastic material is applied directly to the fabric and—as in all laminating processes—is fused into one unit, with the metal and the fabric, by the application of heat and pressure. Where wood grains are desired a thin veneer of wood is backed on paper and the whole resin treated. When subsequently applied to the Bonded-Metal base a plastic surface is achieved which shows the full color and grain of the wood in a finish even higher than that which may be achieved by the fullest degree of wood polishing.

This material, it is claimed, has particular advantages for shipboard use because of its Bonded-Metal feature, assuring the permanency of the lamination. Such sheets may be had finished on one or both sides and it is possible to vary the finish so as to provide a surface of one type for stateroom walls and of another for the adjoining companionway while using only a single panel. This material is laminated by the Mica Insulation Co.

In spite of the fact that metal has been used as the structural base of this type of sheet, neither a metallic feel nor a metallic sound are present. The wood fin-



ishes are, as far as the passenger knows, wood. The flat surface finishes are, to all eyes, lacquered or enamelled wood surfaces. Thus, the new Bonded-Metal sheet—and for that matter, most of the other types of laminated sheets—present none of the objectionable features associated with the use of plain or painted metal. They have, in addition, a long series of advantages, chief of which are: strength of steel, flexibility of steel, light weight, warm colors, fireproofness, surface resistance to cigarette burns and alcohols, etc. They are non-warping, have good machining qualities, are rust-proof, have a low cost, fast colors, high scratch resistance, are easily erected, moisture-proof, vermin-proof, permanent in finish.

So much therefore for a detailing of the materials available. A full explanation of the possibilities of the laminated materials cannot be encompassed within the confines of a single article. Yet it is apparent that the plastic industry has much to offer to the marine engineer and the marine architect, to the ship owner and the ship operator, to the passenger whose life need no longer be needlessly risked. It may be well to quote here the prophetic

words of H. V. Potter, uttered at the British Plastics Molding Trade Exhibition in London last year:

"We have heard a lot recently, and unfortunately, of the terrible fires that have occurred in some of the finest liners in the world. Again I believe plastics will lead to a solution. There is no reason why, in the future, paneling, cabin construction of all types, should not be made of fire-proof plastic materials. In fact, a good deal of work is already going on in that direction, and it is possible today to purchase material which will pass the London County Council inflammability test—which is a very drastic one. I believe that wood, as an internal construction and as a means of decoration of the liner of the future, will entirely pass, and plastic non-inflammable sheets, equally, if not more pleasing in finish, will take its place. The Stone Age has passed. The Iron Age has gone. I believe the Plastic Age is coming. There is every indication that plastics will have a profound effect on construction and design in the future. It is crying out for the artist, the designer and the constructor to bring their knowledge and wisdom to bear on these materials."

FOR DUTY AND BEAUTY

Grist for the editor's mill . . . the photographs and stories of new objects that come with each day's mail. For plastic molders, fabricators and designers are busy in every field of industrial endeavor. Once again, this month, we select ten varied instances of plastic's new conquests—discard, for lack of space, a hundred others equally worthy of display.

Pyralin toiletry sets are not new—but this one, "The New Yorker" is. Of ivory on jet, it carries a non-tarnishable rhodium frame, highly engraved. Comb, brush, mirror and pin-box carry the same simple design, a single white strip across the black background.

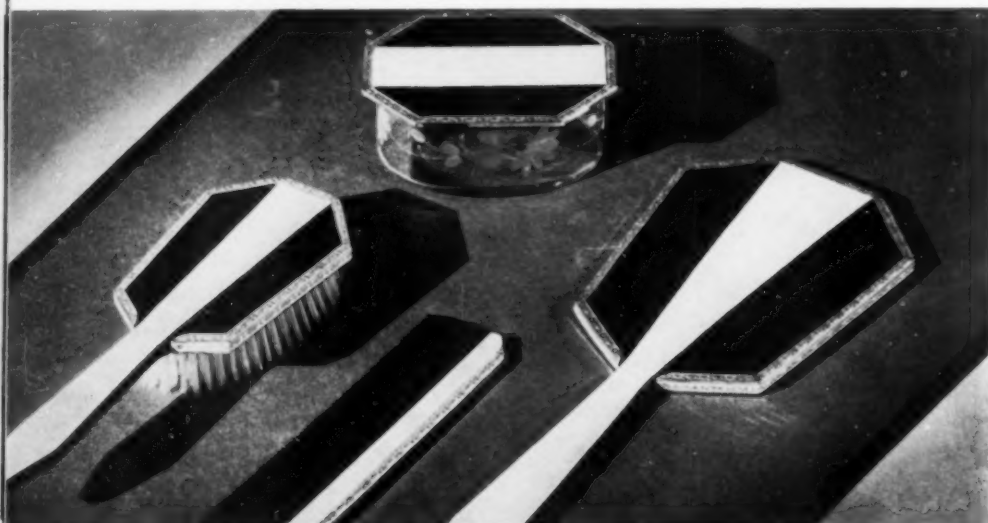
The Momeoscope is an important accessory of the Mimeograph equipment of the A. B. Dick Company—making possible the speedy reproduction of all kinds of ruled forms, line drawings, cartoons, charts, graphs, etc. It supports the reproducing stencil in a frame, holds a light under it and thus provides a sturdy, steady surface upon which to work in preparing the stencil. It must be strong. It must be true. It must remain so under even the most adverse office conditions. What more natural then, that A. B. Dick should turn to a strong, molded frame—unaffected by weather, free from warping, easily cleaned, and always attractive in appearance.

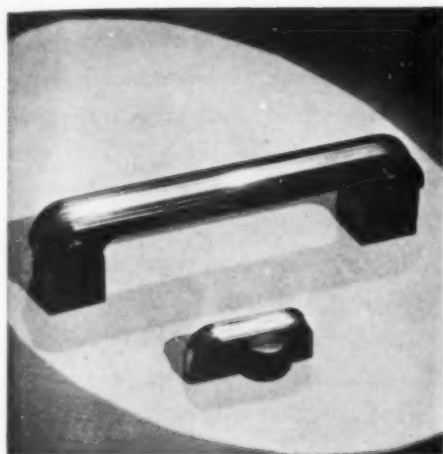
Suggested for manufacturers of artists' supplies—the consideration of plastic's qualities for such instruments as T-squares, drawing boards, etc., where a true edge—always true—is the prime consideration.

New coffee-makers have greeted the market by the dozen in the last four or five years. Here's one that is different. For it logically replaces the customary metal collar with a molded one, formed in one piece with the handle itself. No rusting, no tarnishing, no polishing—and fewer machine operations in the making. Best of all, the Chicago Flexible Shaft Company has considered the user's hand—put fluted grips on the black molded handle.

The electrical field is plastic's own . . . yet plastics still offer new possibilities for progress. Note the Remler Molded Volume Control, a compact unit made more compact by the dual use of molded parts as frame and insulation. Non-warping plastics insure the sturdiness of the unit, for since the plastics maintain their designed contours, the function of the unit will not be impaired, even under difficult operating conditions.

"Take one jigger of—" read the directions for dozens of drinks. "Take one jigger of—" read millions of amateur home-bartenders. Then they frown, scratch their heads, do it wrong and blame the liquor for the ill-tasting result. Hence this new "jigger" measure . . . by which the Harry Davies Company hopes to dispel confusion. Available in many two-color combinations, this device consists of two cone-shaped measuring cups attached at their apexes, so that one forms the base for the other. Non-reactive plastics, strong enough to stand





frequent droppings, easily cleaned and free from taste or odor—obviously the logical choice—are used.

Stanley tools have taken more hard knocks—from professional and amateur workmen—than anyone likes to think of. Today Stanley's tools can take harder knocks, for their handles are made of cellulose nitrate. Hit them as hard and as often as you will; the handles of these screw-drivers and chisels will neither crack nor spread.

Stove handles have long presented a problem to the manufacturer, a problem recently solved, to perfection, by heat-resistant molded or cast plastics. Today the problem is one of design. And that design problem is being rapidly solved, as shown by these two handles of black molded plastics with shining chromium bands, made by the American Insulator Company.

Fifteen years or more ago, the molders' chief opportunities were in the electrical field. Today, radio presents questions of equal interest—and plastics again come to the rescue. Note the Remler Audio Control Unit, a precision device if there ever was one. The more compact a con-

trol unit is, the larger is its capacity—because a single compact unit can do the job of several, less well designed. Molded parts make for compactness, assure efficient functioning because the material is not easily warped or broken.

What with Code Authorities, strike meetings, and seven substitute General Johnson's all breaking gavels at once—something had to be done about it. That something has been done by the Lignum-Vitae Woodturning Company which now employs cast phenolic heads, in a wide range of colors, for its gavels. Lodge insignia can be easily inserted, as the head is made of three de-mountable parts. Special smaller models are made for the less-violent ladies' clubs.

Wherever you can buy Coca-cola, cigarettes are also on sale. And matches are also needed. Hence this Coca-cola match dispenser, freeing the store-keeper of an annoying series of requests, satisfying his customers and (most important the sponsor) advertising Coca-cola at the point of sale. Standing on wetted counters, subject to frequent knocks, built for the years—the answer was, of course, molded plastics.



AS THE MOLD IS, SO IS THE MOLDED PART

By EDWARD F. BACHNER

Chicago Molded Products Company

The following is addressed not only to those who have had no experience in the use of plastic molded parts, but also to the manufacturer whose experience has been so limited that he is still unacquainted with the important part that the mold plays in the production of the molded part. In order to understand the important part that a mold plays in the process of plastic molding, it is necessary to have a simple understanding at least of the usual molding procedure.

Plastic molding materials come to the molder in dry powder form and these materials, if placed in a mold of suitable shape and size and then subjected to high heat and tremendous pressure, first flux and fill the mold cavities and then, under further heat and pressure, solidify perma-

nently into the shape of the cavity of the mold. From this brief description it can be seen that the mold, therefore, is the foundation or base upon which the entire plastic molding art is built.

Design and construction of a mold, as it is good or poor, will affect favorably or unfavorably every succeeding operation in the molding process. A good mold is something more than just so many pounds of metal and hours of machining time. It is the outward expression of years of specialized engineering experience. Each new part to be molded presents new problems in mold design and construction, and these problems are best solved by engineers who through past experience have an accumulated fund of knowledge from which to draw.

The customer's requirements for molded parts are usually conveyed to the engineer

by means of a blueprint, a sketch or a model. They should be accompanied by as much additional information as possible—such as, what the part is to be used for and under what conditions it is to be used; what finish is desired on the part, and what are the allowable tolerances in dimensions, also the customer's daily, monthly or yearly requirements for the part.

The purpose of the piece will determine the kind of molding material required and therefore to some extent, the type of mold needed. Quantity requirements will determine the size or capacity of the mold. Tolerances and finish will have some bearing on what extra operations are required after molding.

If the part as originally designed by the customer presents some molding difficulties or the need of a complicated mold, which will affect the cost of the part or the cost of the mold, the experienced engineer will suggest some slight change in design to overcome these evils without affecting the mechanical requirements or the appearance of the piece, and which will perhaps bring to it a broader and better application.

Having formed a picture in his mind of what the piece is to be used for, and how it is to be used, the engineer is now in a position to decide the size and type of mold best suited; the position that the piece will take in the mold; where parting lines will occur; what draft is necessary in order to release the molded piece from the mold; and what operations are required to make a finished piece beyond the actual molding operation.

All of these points having been decided upon, the next step is to create on paper an exact plan of this mold. A detailed drawing is made showing just how the mold is to be built, and specifications are written covering all of the details and requirements in the molding process. After blueprints are made from it, this drawing is carefully filed for future reference.

Blueprints of the mold, of any metal inserts

that may be used, and of any extra parts required, such as drill jigs, cooling fixtures, etc., together with complete specifications, are delivered to those in charge of the tool room, the molding department and inspection department. Usually, while the drawing of the mold is being prepared, the purchasing department is securing the steel for the mold.

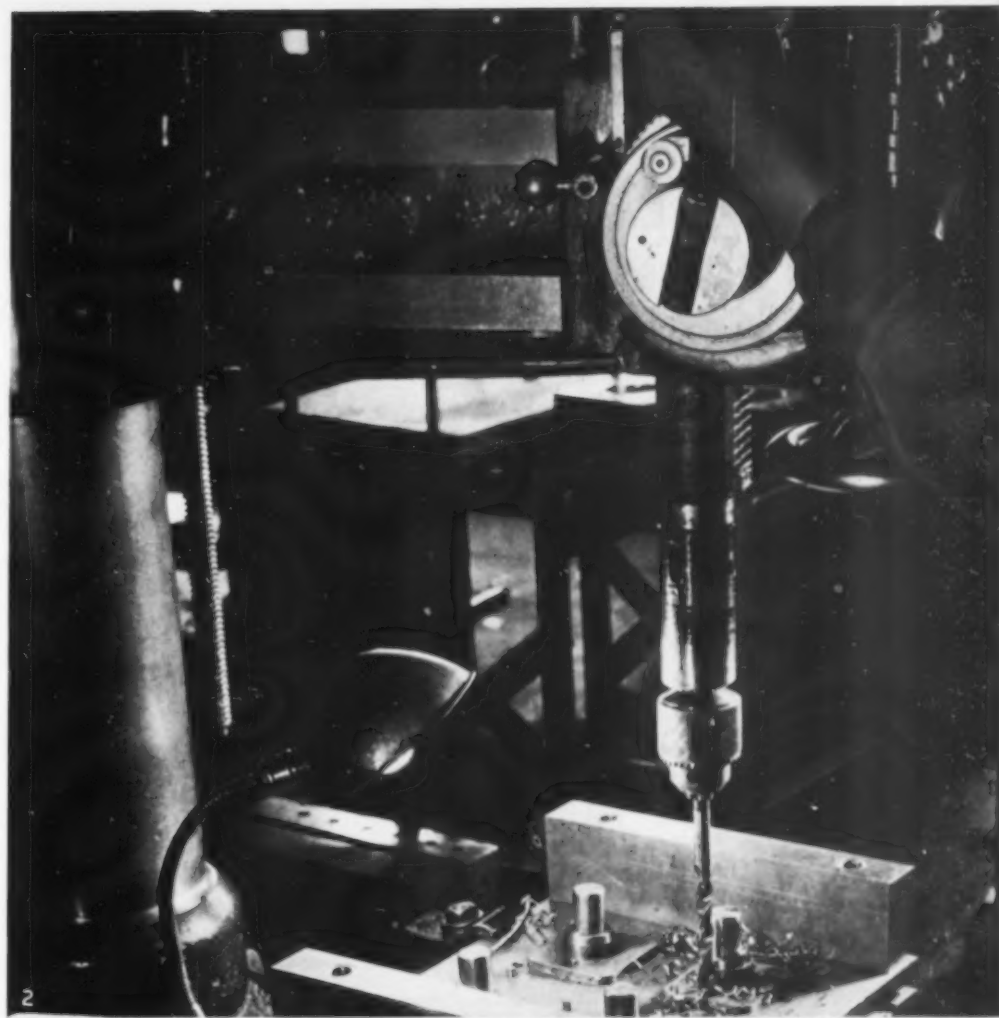
The mold during operation is subjected to pressures as high as five tons to the square inch and to changes in temperature from 350 deg. F. down to 200 deg. F. which cause rapid expansion and contraction in the steel. To withstand these forces, and to preserve the good workmanship that goes into the mold, it is necessary, therefore, that treated steel of high quality be used. The selection of the right type of steel is important, and should be made by someone thoroughly experienced in the various characteristics and qualities of steel.

For a mold having cavities or depressions that can be readily machined or worked out by hand, an alloy steel is usually selected. Most of the alloyed steels deform very little after heat treatment and therefore more closely preserve original machined dimensions. Other steels, such as nickel chromium steel, distort to some extent under heat treatment, but because of certain other valuable physical properties, they can be used to advantage. Other types of steel require hammering or forging to increase their density and so insure a smooth, polished surface in the mold.

There are two general types of molds:

Hand molds, which, as their name implies, are manually operated in and out of the press and are heated by radiation from the hot plate on the press. They are opened for ejection of the molded piece by a separate stripping plate.

Semi-automatic or steam molds are clamped in the press and the molded parts are automatically ejected with the opening of the press, and for this operation ejecting pins must be provided in the mold.





4



5

Channels in both the yoke and plunger are provided, through which heat is forced to heat the mold, and in some cases these molds are cooled by forcing water through these same channels.

The mold designer's selection as to type of mold is governed by several factors. The quantity of pieces required, size of piece and molding material to be used are factors which determine whether the hand mold or the steam mold is best suited.

In order to more clearly understand the various operations through which a mold has to be passed for completion, let us follow through a six cavity steam mold, for producing safety goggle frames.

Illustration No. 1 shows the designing engineer at his drawing board, laying out the mold plan. Because of the somewhat intricate design of the piece to be molded, a split cavity mold has to be used. Parts that are simple in shape and design require only a solid yoke or cavity, to form the outside of the piece, and a plunger or force which telescopes within the cavity to form the inside of the piece. But, if the piece is more intricate in design and has undercuts or re-entrant curves, it cannot be ejected after molding, from the mold, without splitting the cavities vertically as well as horizontally.

Illustration No. 2 shows the steam yoke in which the mold is to be mounted, being drilled for knock-out pins which will, as the press opens after the molding operation, knock out the split cavities with the molded pieces. These split cavities, which form the outside surface of the molded piece, are held in position in the mold by means of a block or nest of steel. No. 3 illustrates this nest of steel being turned up in a lathe to the required shape and size. This particular mold being of the multiple type, with six cavities, a master plunger, or male setction, is first made, and then duplicates for the other five cavities are made on a vertical milling machine from this master plunger.

(Continued on page 60)



possible because of the depth of color. Thus was born but five years ago a type of molding compound which was not intended and does not hope to supplant the phenolics, but which is rather complementary to them. At the present time there are but three "makes" of urea compounds in this country: Beetle, Plaskon and Unyte.

The unique characteristics of urea plastics are not widely known, and it is generally assumed that beautiful coloring is their only excuse for existence. Such is not, however, the case. It is true that the most beautiful colors have been produced in ureas, because the base, or "natural" compound is colorless but, further, com-

Varying qualities induce various uses. The clock case and lighting fixture parts are made of ureas because of their pleasing color and texture, the beer-stick because of alcohol resistance and pleasant-feel, the thermos bottle top and cups because of resistance to food-acids.

Cleanliness and freedom from deterioration made urea-plastics the logical choice when the makers of this soap dispenser decided to abandon painted metal.

WHICH PLASTICS TO CHOOSE? II.

THE UREA PLASTICS

Urea-formaldehyde molding compounds, though but recently come to the field of plastics, have filled certain definite needs, a fact which accounts for their rapid growth and acceptance by industry. They were developed principally to overcome the color and appearance objections of phenol-formaldehyde compounds, which, when introduced about 1908, offered to the molding industry an entirely new type of material, i. e., thermo-setting, or non-reworkable.

As early as 1897 it was discovered that urea and formaldehyde gave an amorphous condensation product, like phenol-formaldehyde in being non-fusible. The subsequent amazing success met by phenolic compounds afforded the stimulus necessary to apply this knowledge of urea to the production of plastics, but efforts along this line did not culminate

until about 1926, when a successful commercial thio-urea compound was developed in England, which had, unfortunately, some of the color and appearance limitations of phenolics. Pure whites and pastel shades still were not obtained and, moreover, the high cost of the compound, its extremely slow rate of cure and the fact that it pitted and stained ordinary steel molds in a short time, seriously decreased its commercial possibilities.

The first successful "straight" urea compounds were developed in this country a few years later—about 1928-1930. These could be molded as rapidly as phenolics, in the same ordinary steel molds, and were only slightly more expensive to produce. Because the resin was water-clear, and through the use of the most highly refined colorless alpha cellulose pulp as a filler, pure white, the most delicate pastel shades and brilliant lightfast hues of molding compound were made. A higher reflectivity and polish on the surface of the moldings was





pletely lightfast shades are shades produced. Certain colors can also be guaranteed by the manufacturers as absolutely "non-bleeding" in alcohol, acetone or any common solvent.

Urea plastics are tasteless and odorless, as witness their continued successful use in the manufacture of molded tableware in which hot foods and liquids are often used. The surface of moldings is pleasant and smooth to the touch, and has the lustre and polish, in addition to the colors, which attracts the eye. Being infusible and high in nitrogen content they will not support combustion, but will char and lose their color at high temperature.

Because of their hard surface and resistance to grease, urea moldings offer a unique resistance to surface deterioration. Test pieces have been exposed to the elements for periods as long as two years without noticeable loss of finish. For the same reason, moldings may be frequently handled and washed, but day in and day out the polish and lustre remains intact. In fact, they tend to improve in polish when handled.

The ureas also offer unique resistance to the common organic solvents, beyond the fact that the colors may be non-bleeding. Urea moldings can be submersed in alcohol, acetone, etc., for indefinite periods of time without harmful effect. They are likewise completely resistant to greases and oils, and molded containers have been extensively used in the packaging of creams and salves having an oil or grease base. Aqueous creams are not generally packaged satisfactorily in these containers, because of the tendency of the material to swell slightly on continuous contact with moisture, but some care-

Urea uses have achieved marked development in Europe. Witness this telephone handset by Sweden's Ericson Telephone Company, done in white with a chromium dial.

fully designed containers have successfully overcome this difficulty.

Urea moldings are quite resistant to weak alkalis such as soap and borax, but only fairly so to weak acids. Strong acids and alkalis exert a markedly deleterious effect, and should not be brought in contact with them.

Moldings are shatterproof and resilient but in no sense of the word "unbreakable." Possessing as they do a certain degree of flexibility, they may often be

dropped onto hard surfaces without fracturing, but continued abuse will have its effect. Generally speaking, the modulus of rupture is between 9,000-16,000 lbs. per sq. in. while the tensile strength is from 5,000-12,000 lbs. per sq. in. Here, as elsewhere, the range of values is largely due to the degree of cure, the highest properties not being required for most applications.

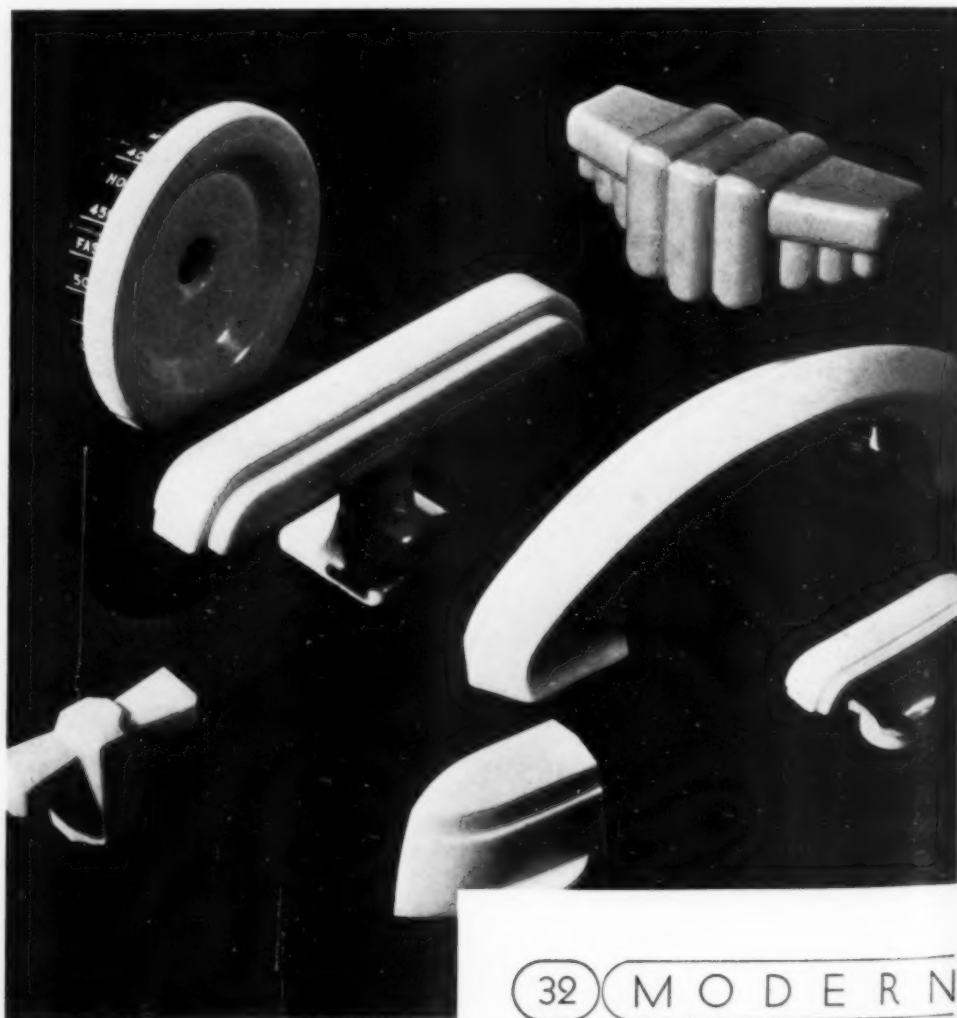
In this connection it is perhaps well to point out that special types of ureas, comparable to the special grades of phenolics (such as canvas-filled, asbestos-filled, etc.), are not manufactured, because of chemical difficulties as well as through a lack of demand.

TABLE OF PHYSICAL PROPERTIES OF MOLDED UREA COMPOUNDS

(Data as furnished by manufacturers of the compounds)

Tensile strength, lb. per sq. in.	5,000 to 12,000
Impact strength (Sharpe) 1/2 x 1/2-in. bar, ft. lb.	0.7 to 1.2
Modulus of rupture (transverse), lb. per sq. in.	9,000 to 16,000
Compressive strength, lb. per sq. in.	24,000 to 30,000
Puncture voltage, per mil.	60 to 400
Water absorption, 1/8-in. section 24-hr. immersion at 20 deg. C. gms. per sq. in.	0.012 to 0.120
Hardness, Scleroscope	80 to 95
Specific gravity	1.48 to 1.55

Note: A range of values is given because different makes of materials may vary between the limits given and because physical properties are usually dependent upon the degree of cure.



High heat resistance has led to wide use of ureas as stove handles, heat-regulator handles and for like purposes. Color and pleasant texture here prove important selling points.

Ureas are much in favor in the electrical industry. Materials may be fabricated into lamp shades and lenses, and highly pleasing effects obtained because of the high light transmission. As regards electrical properties, ureas compare very favorably with phenolics and, for use in conjunction with radio, are considered superior because of their lower power factor at high frequencies.

With the development of the present compounds, it became possible for the first time to run phenolics and ureas interchangeably in the same molds, hardly ever varying the molding cycle. For example, a manufacturer may now order 100,000 phenolic handles and 100,000 pastel green urea handles, without incurring additional tool expense.

The compound is approximately twice as expensive as the standard black and brown phenolics, but compares favorably in price with better phenolic colors.

While the list of urea applications gives conclusive evidence of the versatility of this material, its appearance and decorative qualities account more often than not for its use. For instance, while ureas are

suitable for many mechanical parts, phenolics are generally used unless color and attractiveness are of importance, or unless the unique qualities discussed above are of advantage. On the other hand, packages molded of urea compounds have caused substantial sales increase for the products contained therein.

A partial list of the uses to which urea compounds have been applied might start with buttons and buckles, in the manufacture of which color, rigidly held to standard, is of importance. Closures, from tiny caps for 8 m.m. perfume bottles to 100 m.m. jar caps, are molded in great quantities, as are premium items (such as the seven million biscuit cutters and ten million cereal bowls distributed by one company), and the familiar adult and children's table ware and bathroom fixtures. A complete list would also include containers and packages of all shapes and sizes, for such diverse items as cleansing creams, shaving soap, tissue paper, fruit cake; radio and clock cases; lamps and lamp shades; wall plates and outlet plugs. Millions of automobiles are dressed up with urea knobs and dash

panels, and it is difficult now to find a stove manufacturer who does not use molded urea handles. Popular novelties, giftware, household utilities and decorative fittings are rapidly and efficiently turned out. Space forbids a complete listing of the uses to which ureas have been turned, and today's list would be out of date tomorrow, anyway. This particular type of plastic is still in its infancy, but its applications are already numbered as legion.

Most of the above uses of ureas are practically trouble proof, but care in design and cure of the pieces should be taken in the molding of any heavy section, balls and knobs, pieces with large inserts and parts frequently exposed outdoors, to frequent handling, or washing. It is generally conceded that the molding from urea compounds of plates thicker than $\frac{1}{4}$ in., parts to be sterilized by boiling or to come in continuous contact with water, or high temperature electrical connectors should be avoided.

The material suppliers are always willing to discuss the suitability of their particular type of plastic for any application, and where doubt exists, they should most certainly be consulted if the best results are to be obtained.

Urea compounds are supplied to the molder in either fine powder or granular form, and the latter is usually "pilled" or briquetted to facilitate handling. The material is then placed in highly polished steel dies heated to 280 deg.-320 deg. F., and subjected to pressure of from one to five tons per square inch of projected area of the piece. The heat first causes the material to soften into a plastic mass. For perhaps twenty seconds the mass flows into every space allowed, forming the piece, which then sets into a hard, infusible form. In molding certain types of pieces, it is necessary to "breathe" the mold, i. e., allow the gas formed in the softening process to escape. Recent developments have made this procedure unnecessary in the majority of cases. The piece is left in the mold, or "cured," from thirty seconds, in the fabrication of small objects such as buttons, to as long as twelve minutes, in molding large, thick

(Continued on page 58)



Almost infinite is the number of uses to which colorful, pastel-shaded ureas have been applied. From American switches and demonstration plates, through British opera-glasses and ashtrays, German pouring corks and back to home-molded buttons. Not shown—10,000 other urea plastic uses.

PLASKON

VANTAGE POINT:

"The plastics industry is 66 years old. Yet at 66, it is in its infancy. For the thousands of plastic parts that are manufactured to-day, there will be hundreds of thousands in the near future."

We agree with these direct statements, taken from the declaration of policy of Modern Plastics. The plastics industry is moving ahead with greater speed and more certainty of its purpose than any other industry.

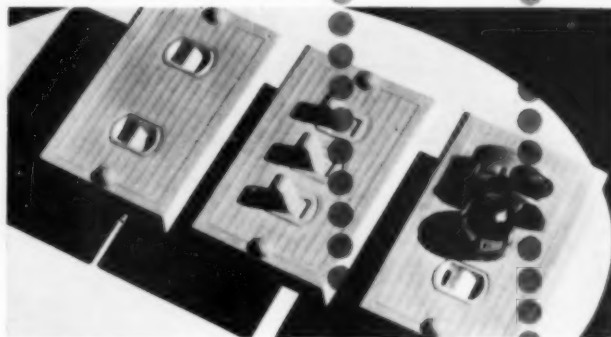
Plaskon — molded color — of course, is at the spear point of the advance. Plaskon is set apart and distinguished by its famous color values, its unexampled durability, the leadership of its technicians, and the skill and ability of its molders.

News of the world of molding compounds, as observed from the vantage point of leadership, will be regularly presented in this manner. Plaskon invites your critical study.

ELECTRICAL:

The Pass & Seymour Despard (name of the designer) line of electrical wiring devices is a develop-

ment that is strictly in trend with the times and a highly valuable solution to the problem of wiring. (23 basic units give—count 'em—59,244 combinations). Each unit is fabricated from either a urea or phenolic plastic—need we mention the obvious fact that Plaskon is the urea plastic used? Ivory is the color choice. Dielectric advantages . . . no possibility of static annoyance . . . size reduced . . . weight reduced . . . 50% less space than formerly devoted to wiring devices . . . simplified modern design . . . soft color . . . easily cleaned color . . . permanent color. PLASKON (molded color) molded by Auburn Button.



WINES:

Here is a pleasant topic. Connoisseurs the world over know Madeira, the golden aristocrat of wines. Favorite of the early Colonials, it has once again assumed its rightful place in America. To distinguish it, to mark irrevocably its identity and quality, the Madeira Wine Association has taken the radical step of placing an indestructible red seal on every bottle. Out of the long list of possible materials, the Association found that one, alone, possesses the richness of color desired and the light durability necessary.

MOLDED COLOR

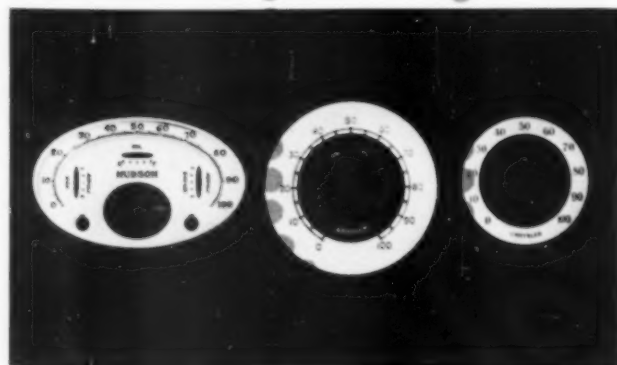


COLOR:

It's easy to rhapsodize about color, but this page is no place for rhapsodies—unless these rhapsodies are clearly and concisely shown in terms of sales success. Plaskon is the proven answer to an insistent demand that color come to plastics, as it must to all materials enticing the consumer's dollar. It may be a standard color for sales success, such as the ivory standard of the Pass & Seymour electrical wiring devices. Or it may be a variety of colors—clean, brilliant, durable colors, such as the Glolite line of lighters utilizes, Plaskon—molded color—is the answer to both.

AUTOMOTIVE:

Time was when the speedometer, clock, and all the little gauges on the dashboard had metallic faces and were impervious to light. So each auto-



motive manufacturer used to rack his brain to find ingenious ways of concealing the light and still allow it to flood the reading area.

Plaskon is changing all that. Look at this year's Graham-Paige and Hudson and you'll see that the light shines through the face—the fine ivory face. The numerals—the black numerals—stand out to perfection. Such an improvement is Plaskon molded color on the dashboard that many others will have it in 1935. Light has no effect on the stability of the color or the material.



Your letterhead and your signature on it, will bring both the useful chain of Plaskon color discs illustrated and the Plaskon—molded color—booklet to you. And promptly.

**TOLEDO
SYNTHETIC
PRODUCTS
INCORPORATED**

T O L E D O • O H I O

SOLVING THE PHENOL RESINOID RIDDLE

When Baekeland announced the solution of the phenol resinoid riddle in 1907, it marked the beginning of an entirely new chemical industry which was destined to play an important part in the development and growth of numerous other industries. For years chemists had struggled with the phenol formaldehyde equation. But their net result was a growth of worthless materials, some of them soluble and fusible and resembling somewhat the known natural gums. Others were porous useless masses. These unsuccessful resins, however, served as a starting point for Baekeland's years of systematic laboratory research—years of toil, disappointments, surprises and chemical blind alleys. By the careful study of the illusive chemical reactions involved, Baekeland gradually succeeded in finding methods for controlling the action of phenol and formaldehyde under well defined conditions. He thus produced a beautiful, hard, transparent material that looked very much like the best natural amber, but was entirely different in its properties and possible applications. Unlike amber, it was much harder, much stronger and heat could not melt it, although high temperatures might char it.

Further experiments followed in rapid succession. Baekeland found that, contrary to amber and other natural resins, his new material was unaffected by solvents and most chemicals. He discovered that he could produce an intermediary product which was called Bakelite "A" and which was either liquid or solid and

was still soluble, but which, on further application of heat, turned into a hard, strong, infusible and insoluble material. As some one put it, his liquid "A" "froze" when it was submitted to heat and could never again be melted. From this moment on he was able to divide the reaction into at least two phases. In the first one the product was either liquid or fusible, in which state it could be used for embroca-tion of coatings, or varnishes or lacquers. But as soon as heat was applied under proper conditions the material "froze" to the hard final infusible condition. All applications of Bakelite are based on those two successive reactions, the final state being called Bakelite "C." He thus produced a hardened material which could withstand water and organic solvents and was an excellent electrical insulator, besides being able to withstand temperatures at which former electrical insulators were destroyed or melted. Hence its many applications in the electrical field. Then, filling the raw material while still in the "A" condition with fibrous fillers, molding materials of unusual strength and accuracy of molding were produced, and these could withstand chemical and physical influences in a way until then unknown.

Pretty soon he counted as many as forty-three industries where his material could be used. It would be difficult to find forty-three today where it could not. His laboratory at Yonkers became a human beehive. Stories of the new agent had already become known, not

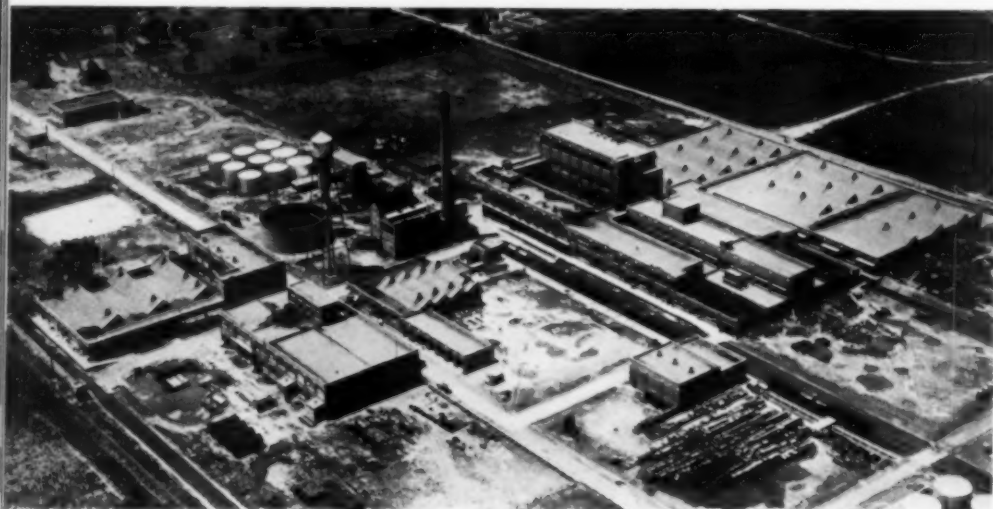


LEO HENDRIK BAEKELAND

Honorary Professor of Chemical Engineering, Columbia University, and President of Bakelite Corporation, Dr. Baekeland has made important contributions to chemistry and engineering, education and industry. He was born in Ghent, Belgium, Nov. 14, 1863, and received his early education in the public schools there, where he gained a scholarship by which he entered as pupil of the Royal Athenaeum. He graduated at the University of Ghent as B.S. in 1882, and D.Sc. in 1884. After receiving the Doctorate, he became Professor of chemistry and physics at the Government Higher Normal School of Science, Bruges, Belgium, later Assistant, then Associate Professor of Chemistry at the University of Ghent.

In 1889 he visited America and accepted a position as research chemist with the firm A. & H. T. Anthony & Co., later known as Ansco Company, now the Agfa Ansco Corporation. In 1893 he founded the Nepera Chemical Company, in Yonkers, N. Y., for the manufacture of photographic papers of his invention. Among the several products of this company, the most successful was Velox paper. In 1899 he sold his interests to the Eastman Kodak Company, to devote himself to chemical research. In 1905, Dr. Baekeland undertook a new line of research which resulted in his invention of Bakelite synthetic phenolic resinoids.

New plastics are devised, new riddles solved in the laboratories of this Bakelite plant at Bound Brook, N. J. Other laboratories are located at nearby Bloomfield.



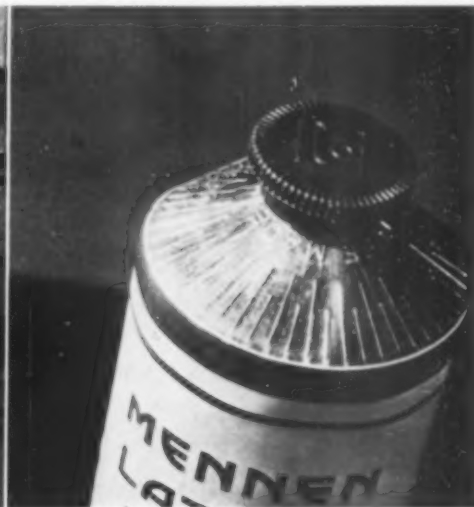
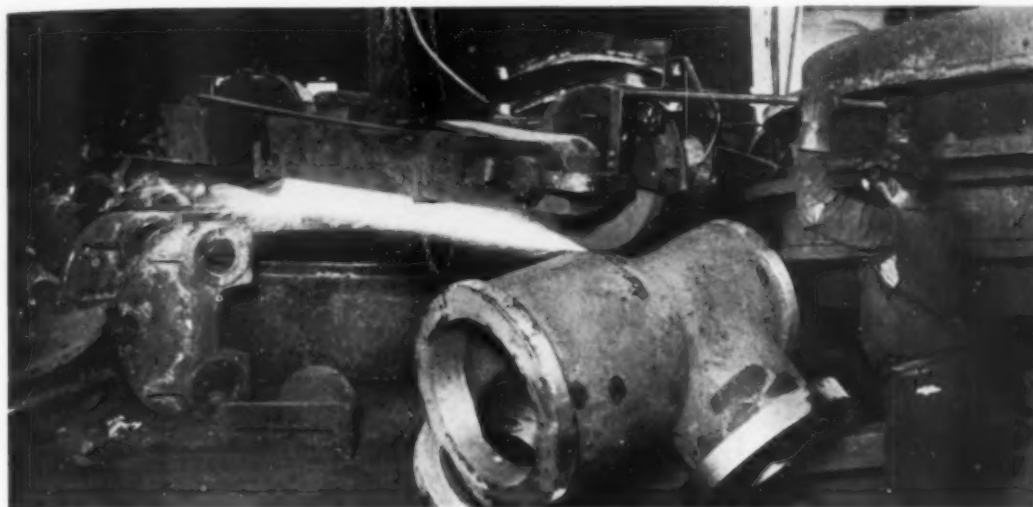
only among chemists who hailed it as a scientific achievement, but in the various industrial fields and particularly in the realm of electricity.

In the beginning Baekeland started manufacturing on a small scale by himself. Unlike most inventors, he did not need financial assistance because one of his former inventions, Velox, a new photographic printing process which is now universally used instead of the former slow sun printing method, and which he

to its office to find out what possibilities these new materials offered. When Bakelite Molded was first shown to the great electrical inventor, Dr. Edward Weston, he wanted to use it for his world famous electrical instruments. He exclaimed, "This is the material I have been waiting for, for a quarter of a century." By the time the unfortunate incident at Sarajevo set the world on fire, the General Bakelite Company was emerging from its adolescent stage and had become

Bakelite resinoid bond holds the cutting grit of this high-speed abrasive wheel—makes possible a fifty per cent increase in surface speeds. Net result—lower costs, finer, speedier work.

Pioneer closure. All present closures on tubes and jars date from this—the first of the lot. Present production—literally billions. Actual tonnage used by closure industry—comparatively little.



had sold to the Eastman Kodak Company in 1899, had made him financially independent. Not hurried by promoters or financial agents, he was able to bide his time before starting manufacture on a larger scale, and to test the merits of Bakelite materials and avoid the usual blunders of rushing too soon into large scale production.

In 1910 Baekeland organized the General Bakelite Company. The term "Bakelite" was selected as the trade name of the company's products in honor of the inventor. Like so many of America's successful organizations, its birth was humble and its growth was a normal, healthy one. General Bakelite Company started with a modest plant in Perth Amboy, N. J. Sales gradually increased each year, new varieties of Bakelite were added, and new applications were discovered weekly; first in one industry and then in another. The news soon spread and, like the maker of the proverbial mouse trap, the company found people trekking

an essential material in the manufacture of a wide range of products. The call to arms brought new demands.

There were insulation parts needed for electrical trucks, tractors and airplanes. There were control devices for battle-ships, destroyers and sub-chasers. There were vital parts of radio and telephone equipment—so essential to the eyes and ears of armies in trench warfare. There was insulation in the timing device for depth bombs. There were protective coatings for the lining of shells. There were control devices for submarines. In all of these Bakelite materials played their important part in meeting the rigid requirements of the ordinance engineers and the manufacturers responsible for the production of these machines of war. In addition there was the popular but less important application of Bakelite Transparent as cigar holders, pipe stems, buttons, fancy articles and jewelry. With the signing of the Armistice, the company immediately proceeded to put its house in order for peace time activities, and to supply the normal needs of industry that had been so neglected during the years of the great conflict.

1921 marked a banner year in its history, for at this time the Condensite Company of America, which worked under a license under some of the Bakelite patents, and the Redmanol Chemical Products Company, which had been producing a line of phenolic resinoid products but against which General Bakelite Company had won an infringement suit, were consolidated with the General Bakelite Company to form the present Bakelite Corporation.

The pace of industry quickened. Automobile production stepped up. Radio caught the public fancy overnight—all of which resulted in increasing demands for Bakelite materials.

Being the result of chemical research, Bakelite Corporation fully realized the importance of constant vigilance of changing trends and further inventions. The old Condensite Company's plant at Bloomfield, N. J., was reconditioned, new buildings added, and the entire plant was turned into a vast modern research center. Laboratory equipment of the latest type was installed. Separate departments were organized for the study of various problems, and each was

manned by a staff of chemists, physicists and engineers who were especially qualified by training and experience to carry on the scientific and engineering work at hand.

At the same time the corporation realized that, in establishing a new industry, it should promote this industry with all the facilities available and give its customers the benefit thereof. So it began a comprehensive marketing plan which has been responsible, more than any other single factor for the rapid growth of plastics in this country and throughout the world. A thoroughly trained engineering organization was established with representatives in the leading industrial centers. An extensive educational publicity campaign started. This reached far beyond the immediate consumers of Bakelite materials and encouraged not only manufacturers but wholesalers, retailers and the public to look upon these materials not as substitutes but as entirely new products with their own individual properties and characteristics.

Most people do not realize that Bakelite Corporation does not manufacture any finished articles. It produces and sells only the raw materials thereto, although freely giving service and consultation to its many customers and assisting them in all their technical problems or difficulties. This is the reason why the average man, although using articles made of Bakelite materials daily, is seldom aware of it. It is interesting to note, however, that an increasing number of manufacturers are identifying Bakelite materials with their products because of their wide acceptance.

This progressive policy was largely responsible for the rapid growth of the industry during the post war period. Through the cooperation of the research laboratory and the engineering staff with many of America's leading industrial concerns, there originated a long list of articles now in daily use, in almost every industry, profession or walk of life: Distributor heads and timing gears for automobiles, telephone receivers, bottle caps and molded boxes, high speed abrasive wheels, dentures for holding artificial teeth, switchplates and plugs, coated waterproof fabrics, synthetic resins for paints and varnishes, cements for incandescent lamp bases, and laminated materials for wainscoting and paneling. All of these, Bakelite Corporation has either initiated or has

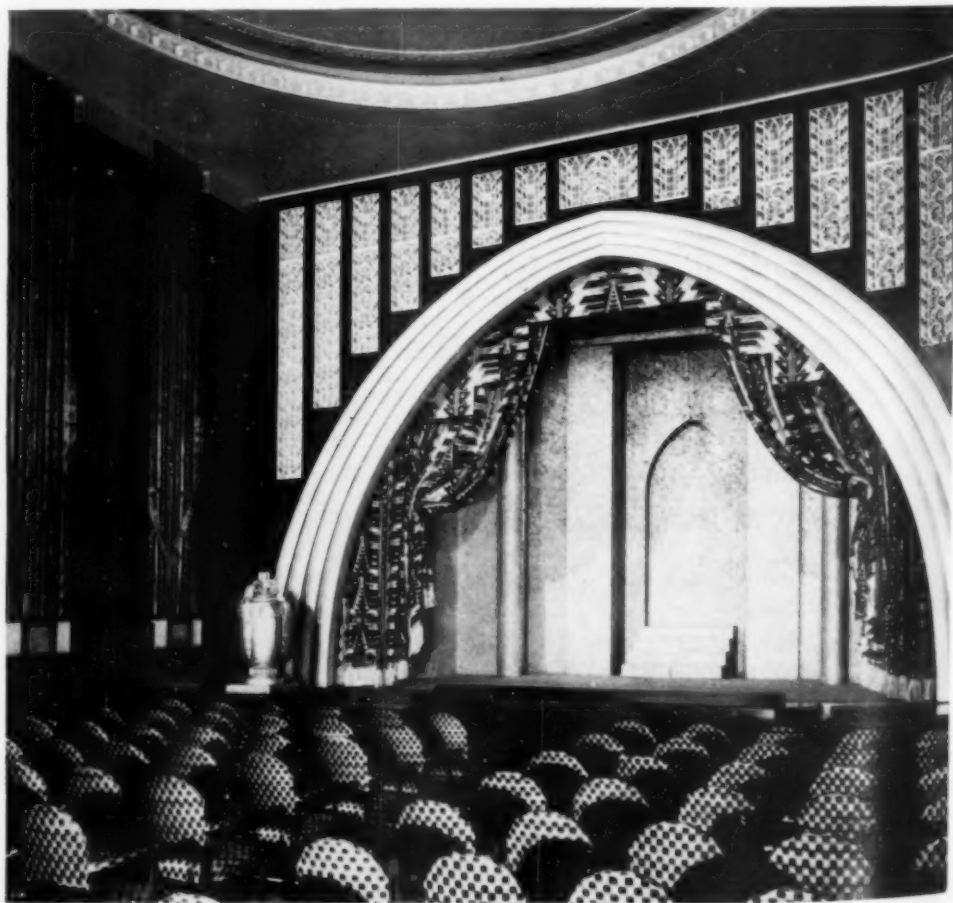
helped manufacturers to develop into practical commercial articles of utility.

As a result of new markets and the constantly increasing number of new materials, additions were necessary at the Perth Amboy plant, and the plant at Chicago was kept busy supplying the needs of the Middle West. Another plant at Toronto was established to meet the demands of the rapidly growing industries of Canada. Foreign affiliations followed in quick succession: first in Germany, then England, then Italy and France and Japan. So that from a small beginning, Bakelite Corporation became an international industry, increasing every year in scope and quantity.

At the peak of the post war boom, plants with all their additions were running close to capacity. Afterwards, when the economic storm broke in 1929, Bakelite Corporation did not lose faith in the future of the country, and particularly in the future of the plastic industry. During the doldrum days of the early thirties, it consolidated its factory facilities in an entirely remodelled central plant at Bound Brook, N. J. This plant covers over one hundred acres of ground and its installation has cost over three million dollars, affording jobs to many

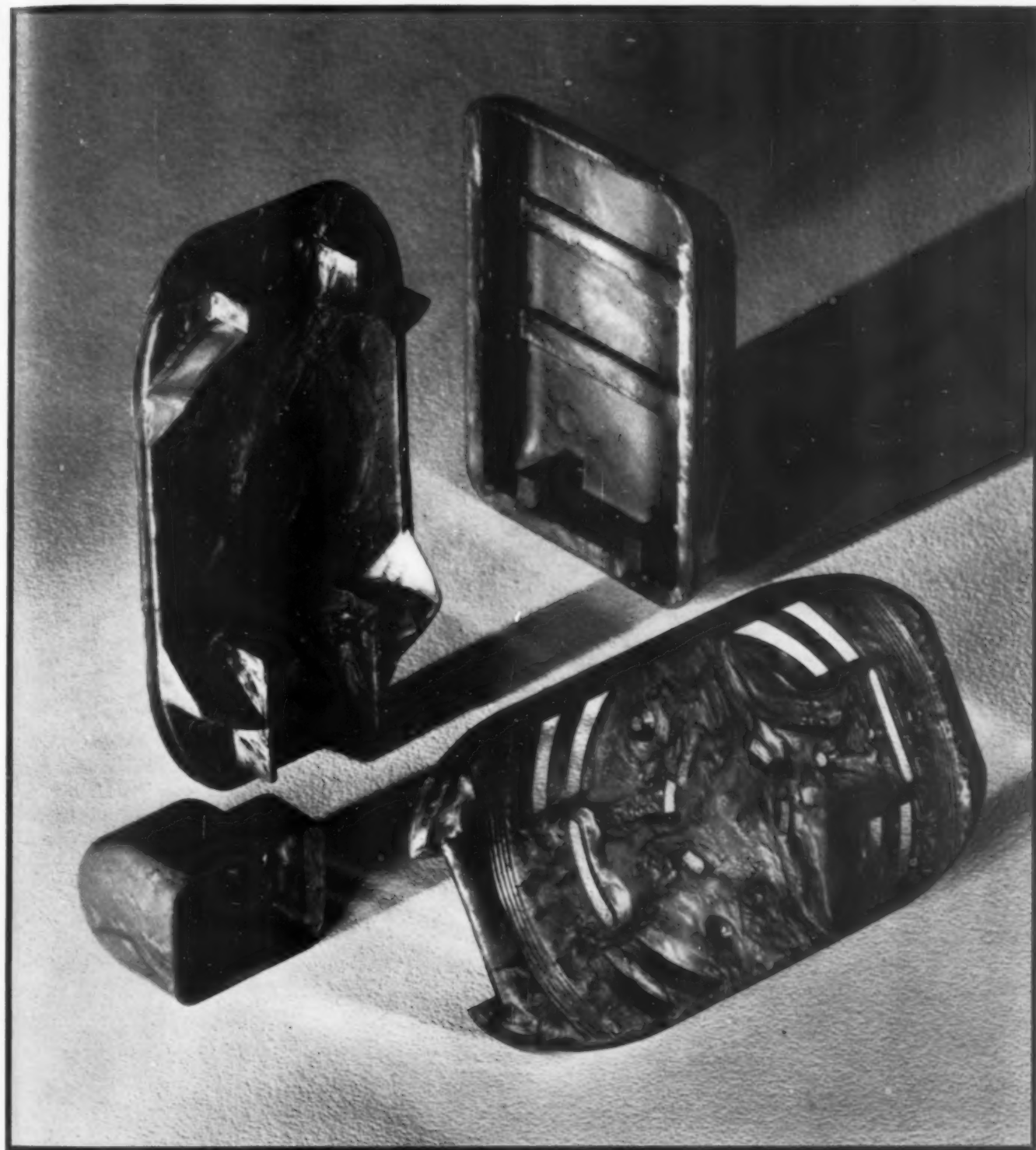
workmen during these times of unemployment. It was completed about two years ago. Since then further additions have been added. Within the buildings of this factory went the culmination of a quarter of a century of experience in producing phenolic plastic materials. Aside from the Bloomfield research laboratories, a system of special factory laboratories was attached to every one of the many departments of the Bound Brook plant. This provides meticulous control of production operations, which insures uniformity of materials and best quality. The number of varieties of Bakelite raw materials sold by Bakelite Corporation have increased now to almost two thousand in number, each sold under a special number designation. And so we find Bakelite Corporation today thoroughly equipped and efficiently organized to meet the needs of industry in the period of rehabilitation ahead.

Greatest potential field for plastics—least developed today—is that of interior architecture. Note side-walls of this, the Chanin Auditorium in New York's towering Chanin Building, where silver metal combines with Bakelite paneling to achieve startling effects. Note also black Bakelite above the silver proscenium arch.



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Radioear microphone, intensifier, and battery cases
molded from Tenite by General Industries Company

TENITE

was selected to encase the de luxe Radioear hearing device because of the beautiful metallic variegated configurations obtainable, and because of the strength of Tenite in thin wall moldings, making for the lightest possible weight in pieces which must be constantly worn by the user • Tenite is a superior thermoplastic made from Eastman cellulose acetate . . . available in all colors, plain or variegated, and any degree of transparency from crystal clear to opaque. It takes a high, lustrous mold finish . . . can be punched, drilled and stamped without danger of breakage • An illustrated booklet on Tenite and its many industrial and decorative uses will be sent you on request.

TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Co.), **KINGSPORT, TENN.**

PREMIUMS, PLASTICS AND PROFITS!

POSSIBILITIES OF PLASTICS IN PLUS MERCHANDISING—I.E., PREMIUM ADVERTISING

BY HOWARD W. DUNK

To establish the fact that the medium of premium advertising is one of the largest factors in *merchandising* (because, although intimately related to advertising, the use of premiums is basically and fundamentally related to the *sale* of a product and consequently should be considered as a *merchandising* rather than an *advertising* cost), a few statistical figures are interesting.

A survey made in recent years, conducted under the writer's supervision, reveals that during the four-year period ending July, 1933, there was an average of approximately two hundred million dollars worth of merchandise (to be used as premiums) sold at wholesale cost, in the United States, per annum. In other words, in that four-year period over eight hundred million dollars worth of premiums were sold.

During the period intervening, i.e., that up to July, 1934, according to more recent figures and data secured for N.R.A. purposes, it appears that the yearly sales of merchandise used for premium advertising have increased so that, conservatively, it can be estimated that in the year 1933-1934 over three hundred million dollars worth of premium merchandise has been sold (at wholesale cost).

Going further than that, and treating briefly on the important subject of the N.R.A. and their trade practice regulations, there is every indication that the amount to be used in 1934-1935 and ensuing years will be even greater. The principal reason for this belief is because of the recent decision of the N.R.A. which, by Executive Order, dated May 28, 1934, release No. 5328, reads as follows:

In view of the extent of the industry, the wide-spread use of premiums, and the fact that premiums at times lend a desirable flexibility to rigid prices, it appears that there should not be a general prohibition against their use.

There are further qualifications in this order, and technical exceptions. But, boldly speaking, premium advertising as such (principally to the consumer) has received the stamp of approval of not only the N.R.A. and the A.A.A., but also the Consumers' Advisory Board.

Fundamentally, these decisions are wise and economically sound, because only under the use of premium advertising is a direct and concrete benefit possible to the consumer; i.e., the ultimate purchaser of the product advertised. This benefit to the person to whom all advertising and merchandising effort is directed insures the success—under most forms of premium advertising usage—of either one of two, or both, essential considerations.

1. A rapid and economic first distribution.
2. The guarantee of repeat sales and increasing sales volume.



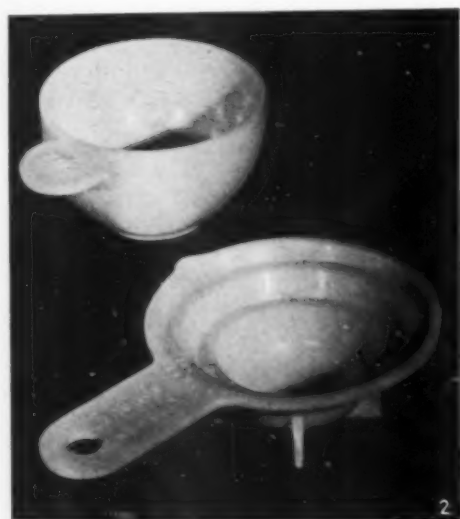
NOTE: This is not the place to describe in detail the few legal and legislative details necessary to a full knowledge of the use of premium advertising. However, there are some state regulations and some N.R.A. regulations which should be considered. Questions on this subject will be answered by the writer upon application to the Editor of MODERN PLASTICS.

PREMIUM PLANS. Before describing the broad divisions of the plans of premium usage necessary to a knowledge of how plastics can, have and should be used as premium advertising, consideration must be given to the fact that, first of all, premium advertising is a part of sales promotion, as well as that of an advertising medium.

It is essential to know primarily the different ways of using the medium. Secondly, and of equal importance, one should know the problems of the user (the advertiser) from the product as well as the sales method standpoint. In this category some of the few facts that are vital to a consideration of the premium advertising plan are: the advertising appropriation; type of merchandise; its method of sale, i.e., whether direct to the retailer

(3) TWO TOPS, from two packages of Biscuits, brought this biscuit cutter to milady. Five million have been sent by mail. Minimum sales directly traceable to this simple plastic gift-premium—10,000,000 packages.

(4) LUCKY is the parent whose child hasn't cried for an Orphan Annie shaker cup. Lucky is the Wander Company, whose Ovaltine sales kited skyward as millions sent for cups, became Ovaltine fans.



(1) IDEA STIMULATOR. The Bakelite Corporation promotes the plastic premium idea at the National Premium Exposition. Also at exhibit—134 other firms, many showing molded articles.

(2) IN-THE-PACKAGE premiums run to large volume—are particularly adapted to plastic characteristics. Witness—the Kitchen Bouquet and Beech Nut Coffee measuring-spoons. Runs—mounting towards the millions.

or through the jobber; branded or unbranded, etc., packaging; unit of sale; retail price; rapidity of turnover, etc. These are but a few of the points of information necessary in preparing either the presentation of an idea (i.e., a premium or a line of premiums) to an advertiser; or in planning a premium campaign.

It should be remembered that, as a usual thing, all advertisers' problems are different, or at least different from their viewpoint. Naturally, there are certain fundamental merchandising factors underlying every sales and advertising problem, but their applications are different. Knowledge gained from past campaigns, from reading trade papers, from experience and otherwise, is extremely valuable and particularly so in the case of a presentation of a new medium, such as plastics, as premiums.

Most important in applying this knowledge is a conscientious study of the Particular problem at hand; its peculiarities and the objects to be attained. Then apply the premium plan that is seemingly best fitted in your recommendation or suggestion.

In presenting or conceiving a plan for the

use of a plastic premium, review the past usage of premiums (if any) by the account in question and, if premiums have not been so used, review uses of plastic premiums by other members of the same industry. Consider why and how plastics can be used to a greater advantage than other premiums. There will be obviously many reasons. Then apply that study to the subject, as related to the following broad divisions of premium usage, and the special requirements of the particular case:

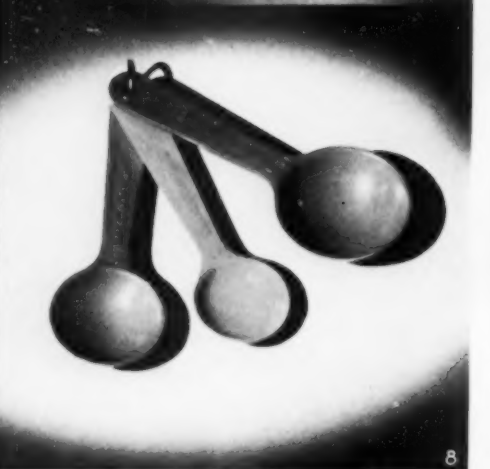
1. CATALOG AND COUPON PLAN.

Essentially this plan incorporates the use of a loose coupon, either inserted in the package, or made part of the package. When accumulated, these coupons are redeemable in varying numbers for the saver's choice of a premium selection shown either in a catalog, supplied to the consumer on request, or shown in a premium store, displayed as all merchandise regularly offered for sale in ordinary channels of merchandising. In some cases, the merchandise is both shown in a catalog and displayed in stores.

Under this plan premium costs can be accurately pre-determined, and in relation to the net selling cost of the product. Costs can be determined first, by definitely knowing the 100 per cent redemption cost of the coupon issued with the unit or included with the product; and, secondly, by a knowledge of the probable rate of redemption of that coupon (depending on turnover and other factors). This varies from 10 to 60 per cent of the full issue of coupons.

The coupon plan is more applicable to products having a rapid turnover such as coffee, soap, canned milk, cigars and cigarettes, etc.

Plastics from stock molds are and can be largely used in this phase of premium



advertising. The reason for this is the fact that premiums used under the coupon plan, listed in a catalog or shown in premium stores are usually purchased on blanket orders, permitting a guaranteed price to carry through for a period of six months to an entire year. It is usually a year. The quantities purchased at any one time are not large, but orders develop with considerable frequency as the premiums move. In other words, the type of purchase is that of the mail order or syndicate store operation. Obviously, therefore, plastic premiums from special molds do not fit this particular picture.

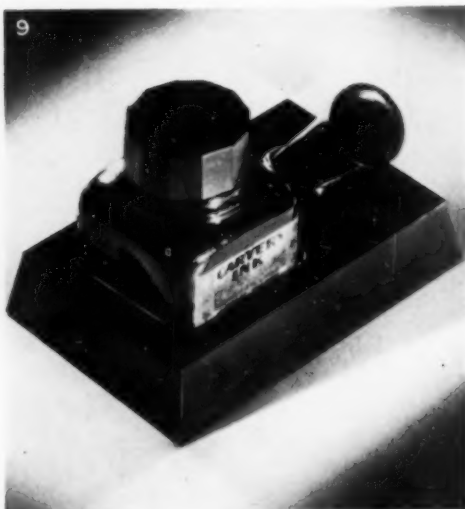
There are phases of the coupon plan of premium advertising under which a special premium is offered at a lower coupon value than regularly offered, and in these cases buyers for catalogs and premium stores place large orders. There have been cases where orders for

(5) TUMBLERS—CUPS—offer a wide field to the premium user whose product takes a liquid form. One firm, making a malted milk powder, sold 200,000 lbs. in 60 days with give-away of plastic iced-tea tumblers.

(6) THROUGH THE MAILS went 5,000,000 Wheaties box tops. Through the mails returned 2,500,000 Skippy Bowls. Grocers, General Mills, kids, parents, molders—everybody was happy.

(7) GENERAL FOODS—Heaven's gift to premium salesmen—makes premiums pay a direct return. For Swansdown Biscuit Mix users, G. F. offers this Flour Scoop. For users of Swansdown Cake Flour—(8)—this measuring-spoon set.

(9) CARTER'S INK Company designed this pen stand for give-away with expensive fountain pens—found dealers selling item as an article in itself. Found, also, little objection to this conversion to a "dealer premium."



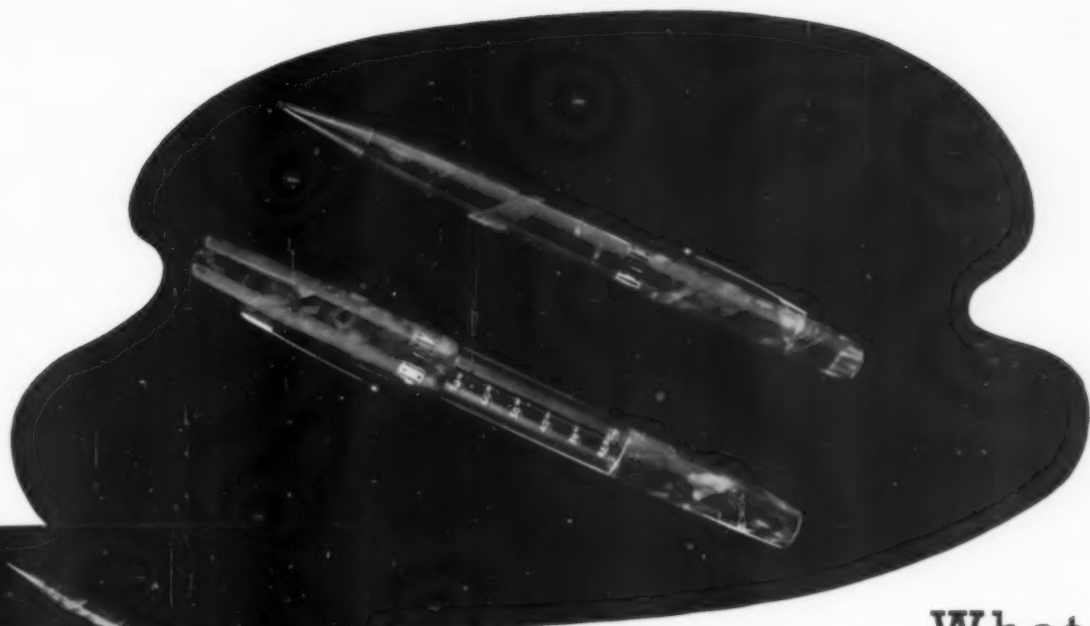
250,000 dozen cups and saucers and 150,000 dozen plates (both of china) have been placed at one time in an order amounting to \$250,000.00. This, of course, is exceptional, but there is nothing unusual in premium orders being placed to be used for "specials" in quantities having a dollar value of \$50,000, \$75,000 and \$100,000.

2. PREMIUM PACKED WITH PRODUCTS. This plan, briefly, involves the outright gift of an article as related to the product, or just as often not. It is necessary, in considering the use of this phase of premium advertising, to select a plastic material article which can be practically included (i.e., packed) in the product package, at the time of production, so as to preclude extra handling at the factory. At times this method is used only as a temporary or initial development. For instance, a plastic spoon in a package of cereal (to introduce a new cereal or a new variety of an old cereal), or it can be developed as a regular procedure, as in the case of a certain brand of coffee which for many years has brought purchasers a china cup and saucer in each 3-lb. can. Another outstanding instance is that of the producer of a trademarked tea who packed silver teaspoons in every 1/4-lb. package of a certain brand of his tea with a resulting sales success.

Plastics, because of their light weight, compactness, durability and because they are, or can be in many cases, part of a set of spoons, cups, saucers, plates, etc., lend themselves particularly well to this type of premium use.

There are many times when the premium is not included—it cannot be done practically—in the actual package of the product itself, but is included in the packing case or wholesale container of 12, 24, 36 or 48 packages of the product. Then it is either packed in equivalent quantities of the product, or if one premium is to be given with two or three packages of the product, in the ratio of 1 to 2, or 1 to 3. Again, plastics fit the particular picture well and practically for the reasons given before.

3. PRODUCT CONTAINERS OR PART OF CONTAINERS BECOMING PREMIUMS. This particular phase of premium use, probably with the one immediately preceding, is most important as related to plastics. The material lends itself wonderfully to the making of the so-



What have **CELLULOID** pen-barrels to do with *your business?*

Like cars . . . pens could once be had in any color, as long as it was black. And, pen sales steadied down . . . and down . . . and down.

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Send us a sample of your product. Our engineering staff will gladly analyze the possibilities for improving its serviceability of appearance, for cutting its cost by the use of Celluloid, Ivaleur or Lumarith. This analysis is yours without cost or obligation. Write to—

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ESTABLISHED 1872

General Sales Offices: 10 EAST 40th STREET, NEW YORK, N. Y.

General Offices and Factory: 290 FERRY STREET, NEWARK, N. J.

Branch Offices: CHICAGO, LEONMINSTER, LOS ANGELES, ST. LOUIS, SAN FRANCISCO

★ **CELLULOID**
NITRO CELLULOSE
Sheets, Rods
Tubes and Rolls

★ **IVALEUR**
CAST PHENOLIC RESIN
in Sheets, Rods and Tubes

★ **H-SCALE**
Synthetic Pearl Essence

★ Trade Mark Reg. U. S. Pat. Office

★ **LINDOL**
TRICRESYL PHOSPHATE
An ideal plasticizer
for lacquers, leathers,
papers, etc.

★ **PROTECTOID**
CELLULOSE ACETATE
Transparent packaging
and wrapping material
in Sheets and Rolls

★ **PROTECTOID**
CELLULOSE ACETATE
Film Base

★ **LUMARITH**
CELLULOSE ACETATE
Sheets, Rods, Tubes, Rolls
and Moulding Powders

★ **SAMSON**
NITRO CELLULOSE
Film Base

called "re-use" package and, because of its intrinsic worth, beauty and durability, as well as its novelty, plastics should be largely used for this purpose. In so far as the writer knows, plastics have not been largely developed along these lines. There have been, I believe, certain approaches as widely separated as making the seal or closure cap on a gin bottle of plastic, this serving as a jigger or measure—to the practice of making the box containing a man's belt or garter set, a plastic "re-use" cigarette humidor. Apparently, there has been little thought given to the use of plastic as containers

the deferred premium cost. In other words, this might be termed the "installment" method of paying for premiums. There are two angles in which plastics fit this plan particularly well:

A. Plastics have large attraction value, from the color, design and practicability standpoint. Stock molds make possible quotations that should be interesting to the buyer of the "advance premium." Plastic articles can be parts of sets: i.e., cups and saucers, dishes, plates, salt and pepper shakers, etc. This fact practically insures a continuance of interest on the consumer's part. They

are possible. The two main divisions are as follows:

A. The method of including with the product or products of a coupon or voucher, or possibly making part of the wrapper or package into the voucher. The voucher itself illustrates a number (or possibly only one) of the articles available for the return of one, two or any number of the vouchers and so much cash. The cash can either cover the bare cost of the article or its cost and overhead of mailing and handling. A possible contribution can be made by the premium offerer in this case by absorbing part of the cost. In either event the consumer obviously benefits by receiving the article at either wholesale cost or slightly less than that. In other words, the organization making the premium offer converts its buying power into the premium value.

Using the "half bought" plan with the coupon consideration as detailed, insures, in some degree, the repeat sale because, as developed, it can mean the return of several coupons, plus the fact that if the articles offered are part of a set, such as cups and saucers, etc., the



for the better or higher priced food products, such as tea or jellies; toilet articles, such as face creams, lotions or perfumes; for jewelry, as well as for the better liquors.

This type of premium application of plastics should be carefully worked out from the initial cost point of view; the objects to be accomplished; and whether the plan is to be carried out consistently, or as a temporary introductory or seasonal experiment.

4. THE ADVANCE PREMIUM. From the plastic industry viewpoint, the advance premium plan offers an opportunity of definitely large volume from two angles, as will be developed:

The "advance premium" is used under the merchandising plan of the Jewel Tea Co. and similar organizations. It is carried out by an organization making house-to-house calls on the consumer; having a line of products subject to repeat sale, such as groceries, toilet requisites, drugs, etc. It involves the offer of a selected premium or premiums, the only consideration being the actual purchase of one or two units of the house-to-house salesman's products at the time. The salesman leaves the premium (or premiums) with the statement that further purchases by the consumer will wipe out

are light in weight, can be packed safely, and in any way desired. There are many other reasons for stock designs of plastic articles fitting in the picture, but those stated are the most important.

B. The second important place of plastics under the "advance premium" usage plan is for higher priced, more elaborate plastic articles conceived for a particular purpose. For example, a coffee dispenser, a tea caddy or a set of canisters, sold on an exclusive basis from the design and idea standpoint, to one of the large houses using this method of premium advertising.

Price limitations as to cost of premiums under this second form of use are much more liberal and range from, in the largest field, 25 cents to as high as \$3.00 each for volume purchases.

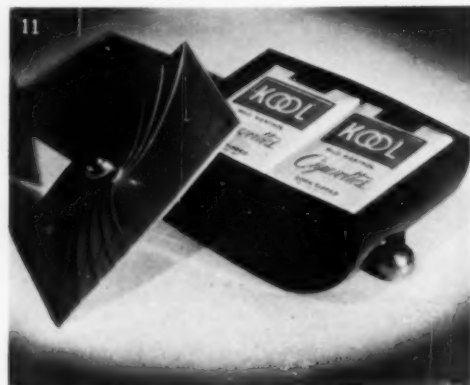
Every plastic molder, as well as every user of the advance premium plan, should carefully study the tremendous possibilities of plastics as advance premiums.

5. "COMBINATION SALE" OR "HALF BOUGHT" PLAN. This plan, developed as it can be in several different ways, is another vital phase of premiums as related to plastics, and profits. There are two important divisions of this form of use, from which many variations

(10) SPOONS—like cups and saucers—appeal to the cereal harassed younger generation, to mothers as well. Hence the success of these two, used by General Foods for Grape-Nuts-Flakes promotion.

(11) HALF A MILLION living-room tables and office desks are adorned by this Kool Cigarette Box. Half a million half-dollars went to Brown and Williamson dealers for boxes and—not incidentally—sold a million introductory packages of Kool cigarettes.

(12) OUTSTANDING among straight-premium uses of plastics is this Sapolio dish—likewise outstanding as an instance of premium association with product-use.



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Out of courtesy to those who received our announcement in the September issue too late in the month to respond to our offer, we have decided to extend it until October 31st. After that, subscriptions will be accepted only at the regular price of \$5.00 a year.

Remember, if you have an unexpired subscrip-

tion to the former publication Plastic Products (now absorbed by and combined with MODERN PLASTICS) you can renew it *in advance* at the special Charter rate of \$2.50! Or if the copy of MODERN PLASTICS is one you have borrowed from a friend, or received it from us as a sample, you can enter a NEW subscription at the special Charter price.

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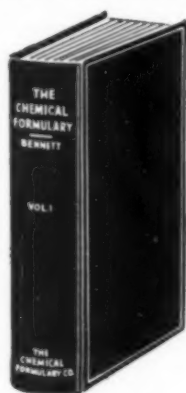
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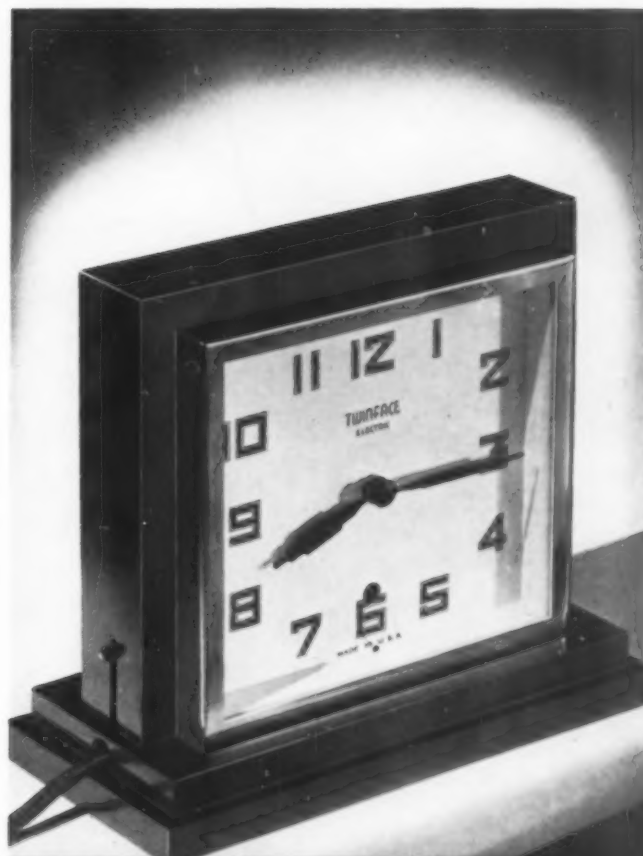
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**Clock case in Ebony Bakelite for
THE CHRON-ART MFG. CO.**

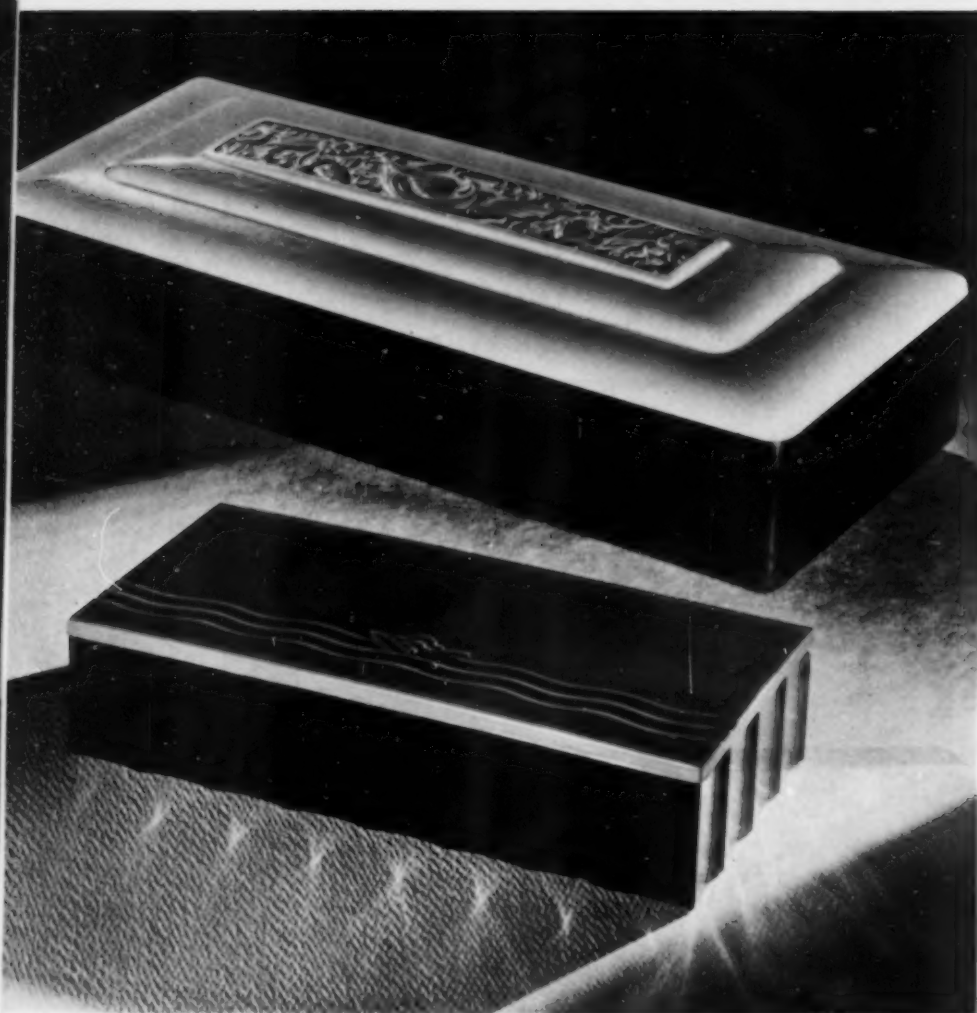
SIMPLE beauty marks the Bakelite case of Chron-Art's well-known Twinface Electric Clock—yet its molding presented technical problems only overcome by Boonton's experienced staff. The skillful use of plastics contributed easy shaping, beauty of finish and lower cost in this case. ★ ★ Boonton expert molding is done for many companies in many fields. The counsel and experience of Boonton engineers are at your disposal.

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MOLDING COMPANY**

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Master Molders of Plastics
Phenolics, Ureas and Cellulose Acetates





(13) OUTSTANDING as boxes, these Oneida containers are outstanding as premiums too—encouraging group purchases of special service silver items. Incidental to premium value, important to sales, is favorable dealer reaction and increased display which well-planned premiumized-packages win.

desire is engendered to secure four, six or eight of each article with the consequent repeat purchase to secure more coupons.

Plastics fit this plan particularly well because of their nature. On an elaborated scheme, special designs of plastics would even more emphatically insure its ultimate success, because of matching designs and color similarity.

B. Beyond this, as a second important division of the "combination sale" or "half bought" plan of premium use, the manufacturer offers, through the regular retail channels or with the purchase of a package (or packages, to lower cost ratio per unit) a premium at a combination sale price lower than the price of the two articles sold separately.

Again, plastics fit this plan admirably because of their individuality, and lightness. When specially designed and molded, as they would be for this purpose, their value is hidden and the consequent

"combination sale" price would be more attractive. As a usual practice, the price of a "combination sale" covers the regular cost of the product with which the premium is offered and the premium itself. Therefore, the value to the consumer lies in the wholesale buying power of the manufacturer making the offer.

6. THE DEALER PLAN. This operation has many ramifications. It has been, and is being largely used by many large organizations in this country. With certain firms that are known to most of us, it has been and is the sole reason for a tremendous business success. There are several broad divisions of "dealer premiumizing."

A. One outstanding use is to offer the dealer a large value premium for his own use, either personal or home. This usually takes the form of an article such as a store clock, scale or a watch, or for home use, a set of dishes, silverware, etc. These premiums are given for, or with, a "deal" order of 3, 5, 10 or 20 cases of a product usually bought in much less volume.

Plastics—except in a special design for a specific purpose or from stock molds, having a high value and having already

achieved consumer acceptance—do not fit this plan as well as they do another and even more important phase of "dealer premiumizing." Its description follows:

B. It must be remembered that most small retailers are in business for a profit. Consequently, if a dealer premium takes the form of an offer of a premium which can either be used by the dealer or can be sold by him to his customers, its value is largely increased. Witness, as an example, the Wrigley Company's offer of a watch with three cases of its gum; and the resulting use of millions and millions of watches.

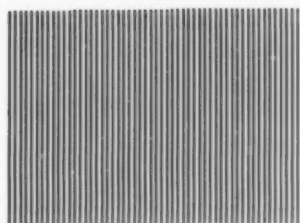
Plastics fit this picture particularly well. The articles used for this type of offer should be made either from stock molds because of having already earned consumer acceptance, and consequent resale value, or be of a special design of something new having palpable high value and real use, which can be supplied at a cost to the premium offerer which enables both him and the retailer to realize a high ratio of profit.

There is, of course, the third form of "dealer premiumizing" involving the packing in the wholesale unit of a merchant's or dealer's coupon intended for the dealer or his clerk. This method, in operation similar to the consumer premium coupon plan previously described, makes for a cumulative self-interest on the part of the dealer in accumulating a large quantity of coupons which he, in turn, redeems for premiums offered through a catalog.

Then the jobber's salesman can be brought into line under a premium plan by offering him a selection of premiums or one special high value premium for achieving a sales quota over a certain period of time. This plan has to be worked with the jobber salesman's employer's permission and cooperation.

7. PRIZE PLANS AND CONTESTS.

This operation consumes a vast amount of merchandise, either specially or regularly produced as premiums. Plastics particularly fit a prize plan or contest operation because a low cost per unit is desirable and a large volume of units are required. A case in point would be a prize plan of a national advertiser, offering a number of large cash prizes for a slogan—with a consequent large number of entrants. Only a few entrants can win the money prizes, but the other entrants should be and have been



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In the first issue of Modern Plastics, we spared no pains, no expense in our effort to make it truly the finest of industrial publications.



Our efforts were rewarded by the most generous acclaim of literally thousands of new-found friends—advertisers and readers alike.



So universal has been this praise that we, knowing in retrospect that this or that improvement might have been made, wonder whether our critics are less vocal than our friends.



We therefore invite you—friends and critics alike—to tell us just what you would like to see in the forthcoming issues of Modern Plastics. What type of article, what type of illustration? Have we omitted any subjects that interest you particularly? Have we overstressed other subjects?



If you . . . and you . . . and you . . . our readers, will tell us these things, we shall then be able to make this fine publication even finer—to key it even closer to the needs of the readers it serves.

MODERN PLASTICS

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15 years of M O L D I N G L E A D E R S H I P

SINCE 1919 this organization has been serving many of America's largest users of molded plastics. Remarkable in this service is not merely the quality of the work turned out but also—and probably more important—the length of time during which we have retained these “old accounts” while adding new ones to a slowly expanding list of satisfied clients.

Explanation? We find it in our complete tool and designing department, in our special press rooms, in our ever modern equipment. But most of all the reason for Kurz-Kasch molding leadership lies, we believe, in the ability and the understanding of the Kurz-Kasch staff—men trained not only in the design and engineering of molded parts and products but also in the understanding of the manufacture of articles in which molded parts are used and of the merchandising and sales problems with which the user of molded parts is confronted.

Plant and staff—ability and understanding—all these are at the service of your designing, sales or manufacturing departments just as they have been through all these years the willing servants of other leaders of industry.



The KURZ-KASCH COMPANY

NEW YORK DAYTON, OHIO CHICAGO
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M O L D E R S O F P L A S T I C S

awarded a low cost premium, such as a plastic measuring-spoon to be given to all entrants in a recipe contest, etc.

8. RADIO PREMIUMS OR INQUIRY "GETTERS." This is a field that is comparatively new but developing rapidly and should be productive of large volume. It is familiar enough in its general aspects, in that an offer is made: in exchange for a postcard request, a souvenir or memento will be sent. The more elaborated plan borders on the coupon premium offer, and involves the sending of a more valuable article for the return of one or more identifiable package fronts or inserts, etc.

In this field plastics should play a large part because essentially the transaction is a volume one, and because it has to be carried on entirely by mail—under either method described as radio premium operations. Furthermore, it is necessary that costs be low, individuality stressed, and compactness, lightness and easy mailability be maintained.

9. SUBSCRIPTION AND CIRCULATION PRIZE OR PREMIUM PLANS. Newspapers and magazines use premiums in many ways. They are commonly termed "prizes" in this connection, and their use is along lines compared with that described for the consumer premium plan above. The only essential difference is, as a rule, that most prize work is directed at boys and girls varying in ages from 6 to 18 years. The exception to this is in plans directed at the reading public itself.

10. GENERAL CONSIDERATIONS ON PREMIUM PLANS. The brief outline above only partly describes the main divisions of premium usage, and could be amplified in much greater detail. It will suffice, however, to outline the most successful methods that have been used, and to indicate how and why plastics, in their many forms, are particularly suited for use as premiums.

In so far as past performances are concerned, in the comparatively few years that plastics have been in existence, the material has provided many articles that have been used most successfully as premiums. From my knowledge of the subject, there have been few failures of plastic articles used as premium advertising, and most of such use has been proved an outstanding success.

As a matter of record and of interest, I

mention a few of these outstandingly successful campaigns with the facts as I know them.

General Foods Corporation has successfully used plastic premiums with many of their products. They were particularly successful in the case of a Humpty-Dumpty Spoon with each package of Grape Nut Flakes, used as an introductory offer and to gain distribution through an appeal to children. The second important use by General Foods was the offer of a molded plastic cake knife, given away with Swansdown Flour. Both of these were premiums given with the products at the point of sale.

General Mills, Inc., was outstandingly successful in its introductory campaign on Bisquick, and is reported to have used over 5,000,000 plastic biscuit cutters. These were distributed by mail—the consumer was required to mail in two tops from packages of Bisquick in order to receive the cutters. Another successful General Mills, Inc., offer was that of a plastic cereal dish—"Skippy Bowl"—for the return of two package tops from Wheaties. It is stated that over 2,500,000 bowls were given away—sent direct by mail.

The merchandising of Ovaltine, made by the Wander Company, has been identified so long with the famous "Orphan Annie" Shaker Cup that the two are inseparable. The quantities that have been used of this one item molded of plastic are unbelievably large. This is a concrete example of the application of plastics to a specific problem, and it produced an outstanding success.

Kitchen Bouquet, long famous in America, last year reinforced its long established place in the housewife's kitchen by an example of the "premium packed with product" plan by including a specially designed, self-standing measuring spoon of plastic in each full size package of Kitchen Bouquet. This is an example of the low cost exclusive premium idea.

As an example of the "combination sale" type of premium offer, the manufacturer of Kool Cigarettes, The Brown & Williamson Company, obtained a special container of plastic to hold two packages of Kool Cigarettes. Hundreds of thousands of these were sold at a combination price of 50 cents to the consumer, for the cigarette box and two packages of cigarettes.

The producers of Johnson's Milco Malt, a chocolate malted milk, have been outstanding in their successful promotion of

sales through premiums. One of their most spectacular successes was the use of over 200,000 plastic iced tea glasses given away in 60 days to sell 200,000-lb. cans of Johnson's Milco Malt.

These are only a few of the past performances of plastics as premiums. The future will definitely show many more in even more varied lines of merchandising.

PRICE, PACKAGING AND BUYING DATA. The house employing premiums on the catalog plan or a service company issuing a premium catalog will use large quantities of articles ranging in cost from 10 cents to small quantities costing as high as \$2.00 or \$3.00 each. Both may use articles having a much higher value than this, but will use them in very small quantities. Here stock molded articles can be used on contract purchase orders as detailed above. On the other hand, the premium user, employing the "free premium packed with product" plan, or the "free at point of sale distribution" plan, or the "half bought or combination sale" plan, has a much larger potential quantity buying requirement. The price range, however, of all these types of uses is much lower than the other, and will be probably between an average of 3 cents to 6 cents on the low side, to a high of 10 cents to 25 cents.

The "advance premium" buyer is a logical market for stock item merchandising running in quantities of 50,000 to 100,000 of an item, at a cost of from 10 cents to \$1.00, and for specially designed articles costing from 10 cents to \$5.00 in large quantities.

When it comes to dealer's, jobber salesmen and radio premiums, each case has its own special requirements that have to be studied.

Packing should be, in some cases, individual, i.e., in separate cartons, or so arranged as to fit the case in hand. As a rule each case is different. Catalog premium houses like drop shipments of moderate quantities. "Combination Sales" people might want units of one or two dozen packed together for inclusion in their products case, and so it goes.

The buying of premiums is usually handled by a special premium buyer in case of catalog houses, tea and coffee houses, etc. In other instances, purchases are made by the sales promotion or sales manager, or a company executive. It is essential that a knowledge of "who to

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FINEST QUALITY
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Concord, N. H.



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**Bookcase in Bakelite for
ENCYCLOPAEDIA BRITANNICA, INC.**

THIS striking case for Britannica's new junior encyclopaedia represents one of the largest single molded pieces produced in this country. Its depth (8¼ in.) and area (13x13 in.) presented unusual problems—met and solved by Boonton's experienced engineers with the aid of up-to-date molding equipment. ★ ★ Boonton supplies the same skilled molding to companies in many fields. Expert counsel and service are at your disposal.

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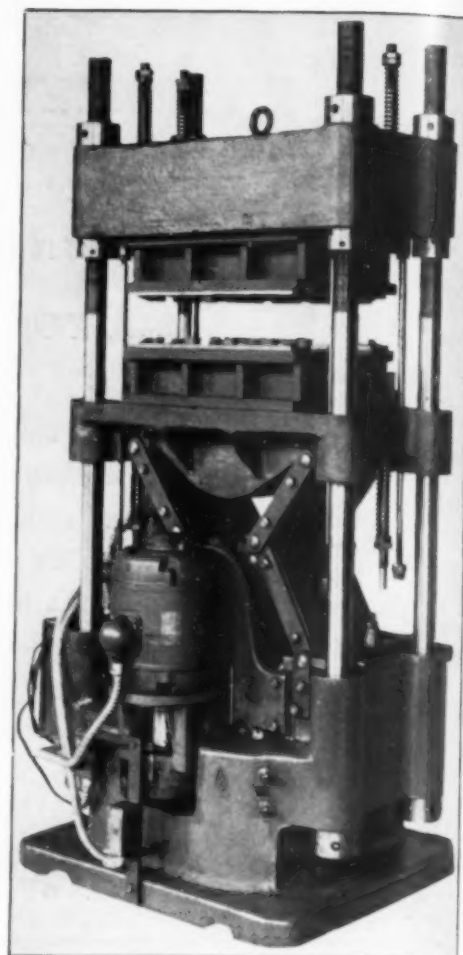
see" and "what to say" be ascertained beforehand.

CONCLUSIONS. It is difficult to carry over through the written word the definite enthusiasm I feel as to the possibilities for plastics as premiums. They are very large. Once again it is well to emphasize here that the premium business in the United States, in the opinion of people who should know, is definitely increasing every day and every month. As evidence of this fact the Premium Advertising Association of America, formerly called the Manufacturers' "Merchandise Advertising" Association, has sponsored for four years past the National Premium Exposition in Chicago. This year's exposition was held at the Palmer House, May 7 to 11, inclusive. It is the opinion of those who have attended all four expositions and round table conferences that the one held this year was not merely better than any one held previously but was so far in advance of any other from the standpoint of the number of exhibitors, volume of attendance and quality of speeches and discussions that there can be no comparison. There was a registration of over a thousand representatives of the largest advertisers in this country.

New Standard Molding Press

Just announced by The Standard Machinery Company, Mystic, Conn., is the new Standard 100-ton molding press which is motor driven and entirely self contained. This press has a platen area of sufficient size to accommodate automatic molds 22 in. wide by 12 in. front to back. The floor space required over-all measurements is 2 ft. 9 in. front to back and 3 ft. 3 in. from side to side. The press is 90 in. high overall to the top of the ejector rods when there is a 19 in. opening between the platen and the head of the press. The opening between the head and the platen can be varied to meet the customer's requirements. The side rods are threaded so as to give an adjustment on the head of 10 in. The platen has a rise and fall of 6 in. It is equipped with both upper and lower ejector system. Both systems have an ejector movement of 2 in. The weight of the press is approximately 8000 lbs. The motor is mounted on the machine itself and transmits its power through a special Cushman "Push-Pull" attachment, direct to the press toggles.

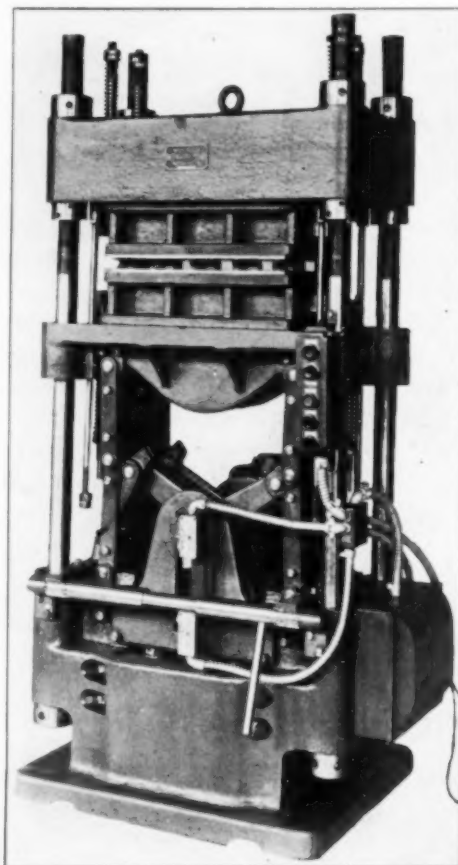
The entire power transmission mechanism, including the motor, is mounted on four heavy springs. When the press is started by means of a double push button system, the platen rises until the pressure on the molds reaches a predetermined pressure, which compresses the springs a certain amount, causing the motor to shut off. As the material begins to flow into the mold the springs again expand, causing the toggles to straighten and at the same time starting up the motor, which will again compress the springs at a predetermined pressure and again shutting off the motor. This movement gives the follow up movement required for the molding of plastic compounds and can be repeated a sufficient number of times to insure the complete transition of the material and pressing it home into the mold. As the toggle members become straighter at each successive movement the pressure is increased, until the time the mold is ready to close, the toggles are at their straightest point and the maximum pressure is obtained. When once this maximum pressure is obtained it can be held for any required length of time without any consumption of power. The motor is controlled by means of a push button station, having two start buttons, one inching button, one stop button and one reverse button. Thus



the movement of the press can be controlled at all times by the operator and by means of a time relay can be made full automatic with any variation on the dwell, within reason, to allow for curing. In other words the operator, when the press is loaded, pushes the two start buttons, the relay is set for the right time of cure and no further attention on the part of the operator is required until the press opens automatically and stops at the completion of the cycle.

The advantages claimed for the press are simplicity in design with few moving parts, gradually increasing pressure as the material becomes plastic and flows into the mold, with maximum pressure being reached at the completion of the molding operation. Another advantage is that this press will close only as fast as the material will flow into the mold. In other words, the press automatically takes care of a very dense or slow flowing material as well as a faster flowing material of less density.

Other advantages are the low cost of running the press, the minimum cost of maintenance and upkeep and its adaptability and efficiency on various types of work.



"NOTHING NEW UNDER THE SUN".....

Oh yes there is and it is a Free Flowing, Phenolic, Molding Compound that will make large and difficult articles impossible to make with the harder resins developed before

MAKALOT

was perfected. The old theory that "it is impossible to have both free-flowing and quick-curing qualities" does not hold good any longer as the Largest Radio Cabinet ever made was molded in four and one-half minutes using MAKALOT.

HIGH HEAT

If you are using High Heat material it will pay you to investigate our No. 75-H for Heater Plugs and No. 75-D, an all mineral filler. They will cure quickly and absolutely will not stick or stain.

OTHER MATERIALS

No. 66-E Shock
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EM 1040 Low Loss
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CAST PHENOLICS AROUND THE CLOCK

We'll admit it! There's at least a double meaning in the title!

Around the faces of modern clocks, be they round, square, hexagonal, octagonal or of oval shape, manufacturers are using frames of cast phenolic resins.

Around the faces of boudoir clocks, to match the pastels and laces of the lady's dressing table, are the pink and rose-beige marbled frames, so much like marble that one might pardon a lady for not recognizing their real identity. And around accessories for the gentleman—severely plain, square-faced timepieces on solid horizontal bases—are the sophisticated onyx and chromium frames of cast phenolics combined with the most flattering metal for a solid color material.

Ovington's, on Fifth Avenue, shows accessories for many hours of a man's day, in combinations of cast phenolics with metal. Beside the striking clocks and

frames, there are picture frames, severely simple, with short blocks of the cast phenolics in color at sides and bottom of the plain glass face. There are smoking sets—the last word in suavity—with deep red bases of cast phenolics contrasting with decorative pieces of gunmetal and small ashtrays of the same metal. In plain red cast phenolics, in the marbled finish, stand the poker chip blocks nearby.

But around the clock, in a wider sense, includes all the activities of an ordinary day. Twice around the dial, from midnight to midnight, and every hour of the day one finds new uses for cast phenolics. Take the early hours of the morning, in an American kitchen. Where one would least expect to find a jewel-like, lustrous material, one finds the whole range of kitchen implements—strainers, knives, forks, kettle covers, can openers—trimmed with cast phenolics. The line of smaller implements comes with severely plain



Style... more style... and still more style. That is the contribution which cast-phenolics make to graceful living. And that is why smart, Fifth Avenue's smartest, Ovington's, features these place-card holders. Cast phenolics combined with brilliant metal.

polished handles of the light jade mottled material, in Jewel kitchenware or the Washburn line. In larger accessories, such as kettles, or electric toasters, knobs and small handles which must be quickly grasped without fear of burned fingers, are all being made of a cast phenolic which is non-inflammable. The waffle iron achieves a sparkle with a cherry knob or with a pull handle in front and immovable handles on each side, of cast phenolic in a brilliant light red.

On the table, known or unknown to the hostess, she may have a dozen accessories with cast phenolic handles. Now that the royal blue and lemon yellow handles for tableware bring informal silver into the color scheme, the housewife may match her eating utensils to the color scheme of her kitchenette or her dining room, or may go in for a line of color contrasts carrying out the vividness of Czechoslovakian china. If the lady serves cream and sugar with a Chase chromium service, with cylindrical or half-cylindrical handles, in the Gerth design, or if she serves coffee in the fluted chromium coffee pot designed by Von Nessen for Chase, she is using accessories with cast phenolic handles.

Amusing salt and pepper shakers in the shapes of fruits take fruit colors in the same material. A wedding of chromium and cast phenolics has changed the style

Don't let anyone tell you men don't know what they're buying. The sales records of these four case phenolic items, at Ovington's, prove that they know—and buy—good looking, long lasting, colorful things.



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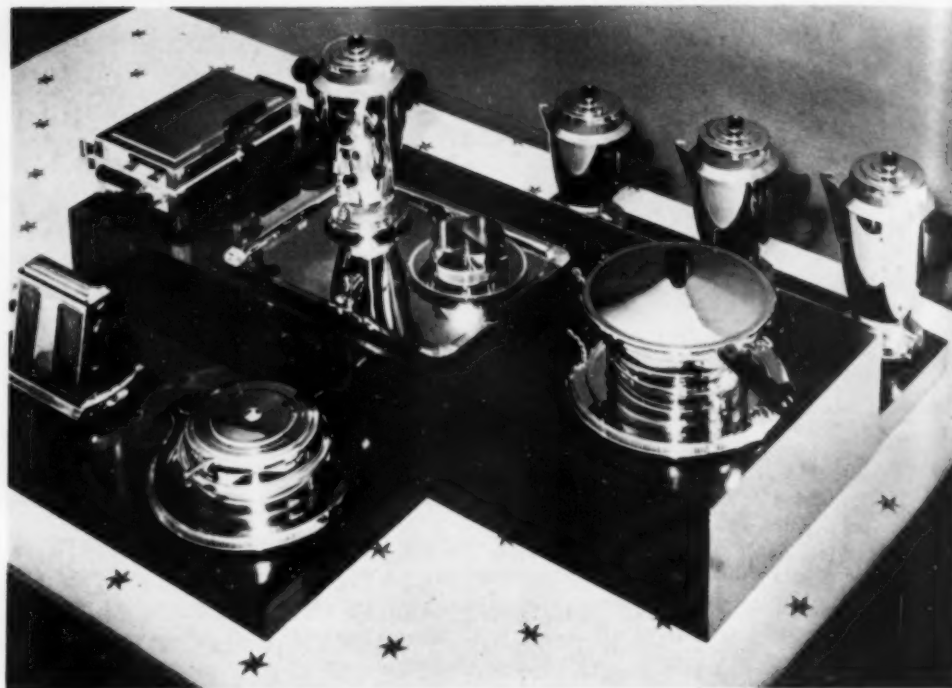
Subsidiary of the

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of serving and dining. Eating, around the clock, is no longer a matter of formality too often colorless, with the cooking and serving accessories blushing concealed in the kitchen. Manning-Bowman's "matched accessories"—toaster, buffet chafing dish, waffle iron, cheese dish and even ash trays—designed by Jay Ackerman, bring the saucy cherry colored knobs and handles of cast phenolics as contrast to the cold gleam of chromium, and the hostess may prepare her meal on the table or buffet with all the showmanship of a well-trained French chef.

Or take cocktail time. Cocktail shakers by many manufacturers—including Universal, with a cherry-topped shaker in chromium, with corrugated sides; nut dishes, cheese plates, canape plates—carry on the merry color combinations. So far, we've seen no chromium accessories with royal blue, green or purple knobs or handles, but it is quite possible that in the future retailer dealers will come to carry a complete assortment of knobs in these colors, to match the color schemes of modern homes. Only the Chase table bells, of Gerth design, have shown themselves with green, marble-like cast phenol handles.

But what about hours around the clock, out of doors? For rainy weather, the smartly dressed woman is frequently seen carrying an umbrella whose handle is of cast phenolic. She may not know that it is so—we found many a sales person entirely unfamiliar with any one of the trade names of the newer American forms of the substance, but the umbrellas were selling, just the same! In clear, crystalline swirl handles resembling crystal but having the advantage of being unbreakable, we saw cast phenolics gaining consumer



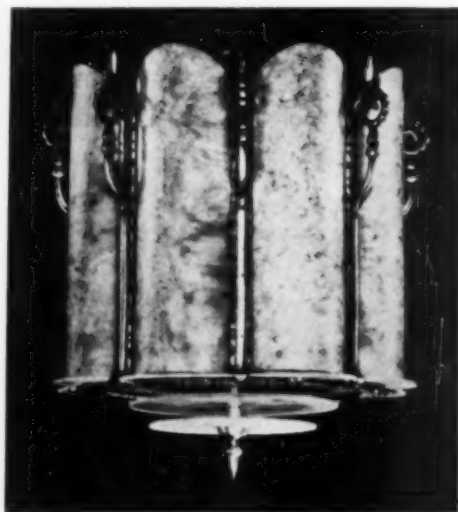
The vogue for shining chromium has a companion style—glistening black or colored handles of cast resins. Those above lend a fitting note of style and color to the Manning-Bowman electrical-serving line.

acceptance. In other forms—the opaque white or ivory or dark green handles, brilliant and carrying a high polish; the

translucent, marbled handle—the vogue was extending itself. Colors ranged through the transparent, light crystal, to dark greens, browns, reds. Carved, or plain, in fancy shapes like birds' heads, or in abstract forms like circles or straight rods, a great number were made of cast phenolics. Wood, ivory and bone were in the minority.

Are all new uses of cast phenolics jointly used with metals? Is the beauty of the material most apparent in combination? Is the trend toward these combinations rather than alone? As hanging lighting fixtures, lamps, novelties in display fixtures using cast phenolics with metal, will the objects made of cast phenolics alone come to look cheap?

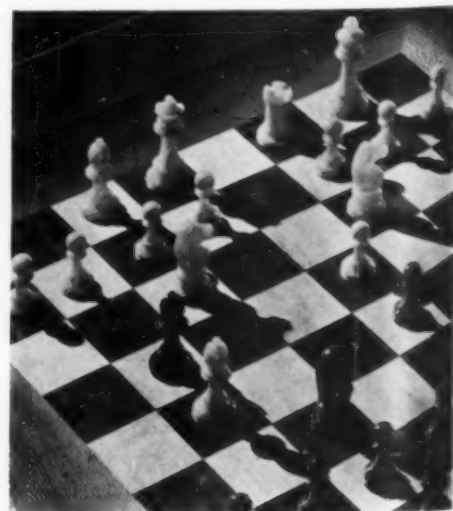
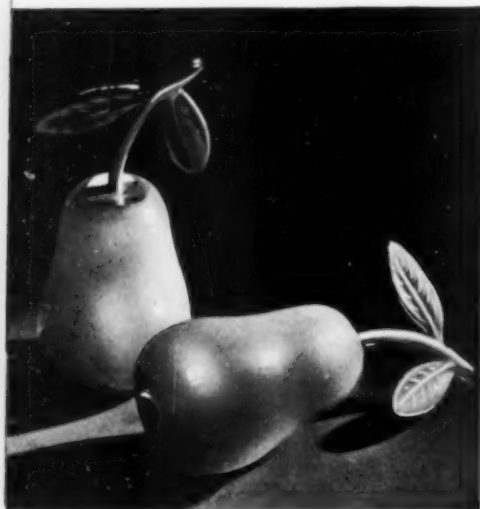
Most certainly no. The style established in costume jewelry, where frequently the cast phenol substance showed and metal was used only as a framework, is definitely established.



Above, Public buildings by the dozen are graced with cast-phenolic lighting fixtures, such as this. Soon private homes will boast them, in equal profusion. Translucence and pleasing distribution of light are the reasons.

Left, salt and pepper shakers of pastel-shaded cast resins combined with gold. Ovington's say they sell . . . and sell . . . and sell.

Right, Rapidly replacing the traditional ivory, cast resins are conquering the chess-board.



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A thousand items use cast phenolics, and these only, although some metal parts may be used in their construction. Take the humble cigarette holder, which, to all intents and purposes, is purely cast phenol in dull ivory, lustrous quartz in blue, green or amber, or other colors. Here the metal section is concealed. Inside the holder a metal de-nicotinizer is used, but would never even be suspected, unless one unscrewed the lower section.

Buttons, with and without metal fittings; belt buckles; bracelets; knitting needles; rings; poker chips; dice; millinery ornaments; attachable initials—all are now being fabricated from cast phenolics, frequently without metal fittings. Chessmen, simulating ivory and ebony, are a late application.

Is this diversity of use cheapening to the product? Is it endangering the sale of jewelry of the better kind? Is it over-exploited?

Again we believe the answer is "No."

In such an accelerated pace as that kept by modern industry, it is not possible to segregate any one material for use only by luxury lines. With the exception of platinum, which will probably never be used in mass production because of its great inaccessibility and difficult fabrication, all metals and almost all synthetic materials are daily being used in expensive and also inexpensive lines. The same rule must apply to the use of cast phenolics that applies to all other substances, fabrics and materials in everyday life: If the design and color are in good taste, and if the product is not only beautiful but peculiarly adaptable to the use for which it is made, it will bring a good price. If it lacks either real beauty or real appropriateness, no boosting or price levels or artificial curtailment of production can keep it in the luxury class. But skillful merchandising can help to keep it there.

Therefore, we believe that the worries of distributors of jewelry in cast phenolics are, in a way, unfounded. We don't deny piracy, or the prevalence of cheap imitators. But this exists in every field.

Fashion, and the automobile industry, to name two, must meet the same problem.

They solve it by the constant release of new and improved designs, more beautiful and more appropriate, for the most part, each season. The manufacturers of products in cast phenolics will undoubtedly have to do the same thing.

WHICH PLASTICS TO CHOOSE? II.

(Continued from page 33)

castings such as radio cases. Generally speaking, the dimensions of the molding determine the length of cure, but where it is to be exposed to water, or outdoors, a thorough cure is always necessary.

Unfortunately, apparently perfect castings may be removed from the mold before being more than partially cured, but these will deteriorate upon the slightest exposure to moisture. To prevent this undercure, test moldings are often boiled for from five to fifteen minutes, and no chalking or whiteness of the surface should result. Where a thorough cure is always necessary, as mentioned in the preceding paragraph, pieces may be tested by boiling in water for fifteen minutes, then immersing them in cold water for five minutes. The gain in weight should not be more than .030 gms. per sq. in. if the pieces are thoroughly cured and may be as low as .020 gms. per sq. in.

Overcure, or burning, is at once apparent because of perceptible discoloration.

The finished pieces are removed from the mold, and the "fin," or thin collar of material forced out at the parting line of the mold, must be removed. Inasmuch as this is usually only .003 to .008 in. thick it is brushed off with the hand, and the surface smoothed down with a file. The pieces may then be tumbled in special revolving barrels, or buffed on a cloth wheel. If the mold has been highly polished, this step is often unnecessary, but buffing and tumbling will always heighten the lustre of the surface.

In molding ureas, the utmost precaution must be observed in keeping the material clean. If possible, the presses should be in rooms apart from those in which phenolics are molded, but when this is impossible, the presses are usually shrouded with dust proof cloth. Compressed air is employed to blow any foreign matter from the molds, and the material itself is carefully covered, because a single speck of dirt will cause a casting to be rejected. Finished pieces are chip, rust and corrosion proof, and possessed of a smooth surface and high lustre. They may be tapped, drilled or subjected to any common machining process, but machining of the surface should usually be avoided, due to the possibility of checking after

long periods of use. A machined surface can, however, be highly polished.

Lettering or fancy designs may be impressed into the surface of moldings, and if desired, the depressions may be wiped in with colored lacquers. Conversely, lettering may be raised on the surface when desired, by means of a slight alteration on the molds.

An immediate shrinkage of from .004 to .008 in. per in. takes place in the castings soon after being removed from the mold, followed by a further shrinkage up to a maximum of .011 in. per in. from mold dimensions, at low humidities. An allowance of about .010 in. per in. from mold dimensions is therefore usually recommended. By careful, controlled fabrication castings may be held to a tolerance of plus or minus .002, but it is advisable not to specify tolerances as narrow as this, because of seasonal variation, which has been observed to be as high as .002 in. per in.

Urea moldings will withstand about 170 deg. F. continuously, and as high as 225 deg. F. for short periods of time. At temperatures higher than these discoloration and loss of strength are apt to take place. Inserts are frequently molded into urea pieces, without harmful results. Large flat inserts up to 1½ in. in diameter have successfully been used, and thick, heavy slugs molded into place. The molded piece will give enough upon expansion and contraction of the metal to compensate for the difference in the coefficients. The insert should not, however, form any considerable part of the molded piece.

As with the use of all types of plastic compounds, pieces which are to be molded from ureas should be carefully designed and studied before the molds are built. Dies are quite expensive and while they can sometimes be rebuilt if engineering errors are discovered, this is a costly process and one which is not accomplished in a day.

Ureas mold as readily and easily as phenolics, but the standard of fabrication is higher because the pieces almost invariably go into fields where appearance is of the greatest importance. Internal defects and specks of foreign matter do not spoil the appearance of phenolic moldings, but may cause the rejection of a light colored, translucent urea piece. However, castings satisfactory in every respect are produced by modern molding methods, in the best shops throughout the country.

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Uniform Screen Analysis

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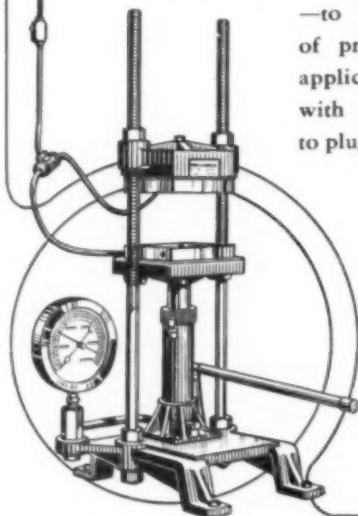
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On the Subject of KICKS



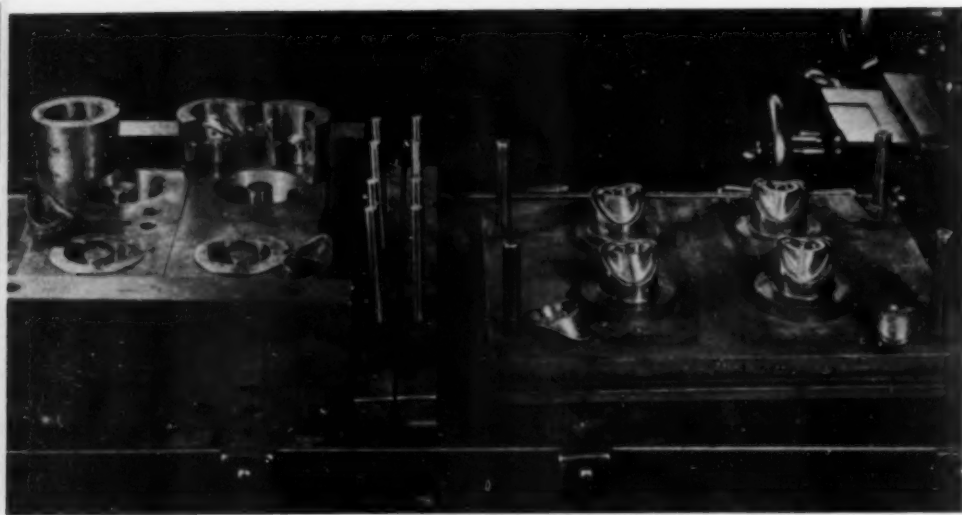
Present day molding standards have educated the user of Plastics to expect excellent color match, absolute conformity to shape and toughness. Any deliveries, therefore, that do not meet exacting requirements are promptly rejected. The frequent use of the Cambridge Mold Pyrometer will go a long way towards producing trouble-free products . . . therefore stopping kicks.



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Send for details of these instruments. They will help save money and make better plastics.



AS THE MOLD IS, SO IS THE MOLDED PART

(Continued from page 30)

In illustration No. 4 will be noted, on the right, the finished master male section and, on the left, the partly finished duplicate. The pointer rests on the master section and, by following the contour of the master male section, guides the routing tool against the duplicate section. This same operation is carried through in forming duplicate female sections of the mold.

Sometimes a cavity or depression in the mold, due to its peculiar shape or contour, cannot advantageously be machined or worked out by hand, in which case the "hobbing process" is used.

A "hob" or hardened steel master of the exact size and shape or design of the part to be molded is forced by degrees into blocks of soft ductile steel. As this hob is forced part way into the block, it sets up stresses and strains in the steel, and these stresses and strain have to be

relieved by annealing. This forcing and subsequent annealing is continued again and again until the hob has at last reached the required depth. After a mold has been machined or hobbled to its final shape, it is then heat treated or hardened to withstand the abuse to which it will be subjected in the molding operations.

After the heat treatment all mold surfaces are finished by hand and polished with oil and emery to a mirror-like smoothness. In some instances, to preserve the finish and to protect it from the effects of moisture, the mold surfaces are chromium plated.

In illustration No. 5 is shown a skilled mechanic putting the finishing touches on the female section of this six-cavity steam mold. All of the sections, parts and equipment, for this mold, having been finished, the mold is now ready for assembly and delivery to the molding department. In

the final illustration is shown the assembled mold and finished parts.

If, from the foregoing brief description, some idea can be gained of the many necessary steps in the design and construction of a mold and the care that has to be employed in order to make a good mold, it may prove helpful to the reader in his selection of the mold and the designer and maker of his mold.

"ON ME"

Molded plastic cases for small toys and for game accessories seem to be coming in as strong rivals to the enameled metal cases so popular for a long time.

"On Me," one of the smartest new roulette games of the decade, in its con-



struction employs plastics in red, light jade green and black, with contrasting chromium bases for the small box housing its mechanism of chance.

A nice coordination of package and product is arranged by the designers of the game. Ray Rice, president of the House of Gadgets, manufacturers of the "Fizz-It" cocktail tray and charged water bottle opener, is responsible for the smart ensemble. The gaily drunken figures on the alternate light and dark squares of the 15-in. x 15-in. layout on silver imitation leather are the handiwork of Norman Guthrie Rudolph, well-known illustrator. And the matching red-and-silver, green-and-silver or black-and-silver checkerboard boxes with the "Old Fashioned" cocktail illustration are the result of the combined efforts of Rice and Rudolph. Smart shops all around the town will carry "On Me," to retail at \$2.50.



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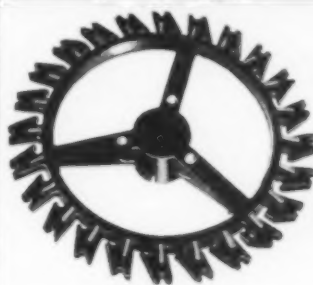
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NEWS AND DEVELOPMENTS

D. M. WILHELM, sales manager of The Patterson Foundry & Machine Company for the past four years, has been elected secretary of the company, being succeeded as sales manager by E. M. Underwood, formerly division sales manager, at East Liverpool, Ohio.

Graduated from Carnegie Institute of Technology in 1923, Mr. Wilhelm was for several years plant engineer at the Springdale Power Plant of the West Penn Electric Company at New Kensington, Penna., leaving the West Penn to join the Patterson Company in 1927 as field engineer, being transferred to the sales department two years later and becoming sales manager in 1930.

ERNEST BADER, managing director of Scott Bader & Company, Ltd., London, suppliers of raw materials such as cellulose acetate, synthetic resins, etc., will be in New York from Sept. 30 to Oct. 10 at the Pennsylvania Hotel. Mr. Bader is desirous of getting in touch with any one in the plastics trade wishing to establish connections in Great Britain or Europe.

EDWARD ROSENDAHL, technical adviser of the Glyco Products Company, Inc., Bush Terminal, Brooklyn, N. Y., has been appointed vice-president and general manager as of Sept. 1, 1934. Mr. Rosendahl, a graduate of The University of Manchester, England, was formerly Professor of Chemistry in the Sassoon College, Baghdad, Iraq.

The sales and purchasing departments of the Glyco Products Company, Inc., will be located in the Flatiron Bldg., 949 Broadway, N. Y. C., beginning October 1, 1934. The laboratory and plant will remain in Bush Terminal, Brooklyn, N. Y.

The Du Pont Exhibit on the Boardwalk at Atlantic City, N. J., ushered in the fall gift season by comprehensive display of all the lines in the new Pyralin and Lucite toiletware recently developed by the DU PONT VISCOLOID COMPANY. One of the large boardwalk windows was decorated with many of these gift sets.

The new sets are shown in a range of colors which are based on a selection

made from the favorite colors as indicated by the style centers of Paris and New York. In them are such shades as ivory and black; black, alone, which has been indicated as one of the outstandingly smart colors for the fall and winter; rose, maize and jade, satin pearls in new shades, American beauty, turquoise, peach on crystal, satin pearl on rose, jade and maize on crystal; translucent jade, maize and rose.

Formation of a design registration bureau has been announced by the NATIONAL ALLIANCE OF ART AND INDUSTRY. Operation of this bureau will give, pending effective legislation from Washington, every available protection to original designs that may be submitted by designers or manufacturers.

According to the announcement of the National Alliance, design registration will be free to its members, with certain necessary restrictions, while a small charge will be made to non-members.

An actual Catalin disc is mounted so that, as the reader glances through the pages of a descriptive booklet recently published for the AMERICAN CATALIN CORPORATION, 1 Park Ave., New York, it remains visible at all times. Illustrations showing uses of this material, as well as specifications, properties and other pertinent information are included. The booklet was designed and produced by Walter J. Gallagher.

National Electrical Manufacturing Association will hold its 1934 annual meeting at the Palmer House, Chicago, Ill., Oct. 16 and 20, inclusive. The program includes two general policies division meetings as well as section, group and sub-group meetings.

ALADDINITE CORPORATION is opening a new factory at 49 Dickerson St., Newark, N. J., in addition to its present factory in Orange. The increased facilities are necessary on account of the improvement in business. The executive offices will also be at the new address.

PORTABLE VACUUM CLEANER

The announcement by the Invincible Vacuum Cleaner Manufacturing Company, Dover, Ohio, of a new portable industrial vacuum cleaner is of special interest in the savings it offers the plastic industry. Built to remove large volumes of dust and dirt quickly and economically, its savings in cleaning costs, removal of dangerous dust deposits and betterment of product and working conditions are most important. No dust is scattered, it is picked up and taken out.

The cleaner is said to be so powerful that once over with the cleaning tool removes all dust from floors, walls, ceilings, overhead pipes, beams, machinery, conveyors, ovens and other equipment. Although built to withstand a lifetime of hard usage, it is compact and easily taken any place by one man. When necessary, two sets of cleaning tools may be operated at one time. The Invincible industrial master truck is powered by a 5-hp. motor. A specially designed 4-stage turbine driven by a 3-groove Texrope drive produces 72 in. of vacuum and handles 265 cu. ft. of air per minute. Compactness may be judged by these over-all dimensions, height 57 in., width 21 in., length 67 in. Of more than ordinary interest is the longevity of its scientifically designed and wide assortment of industrial cleaning tools. All exclusive features of Invincible portable vacuum cleaners are included in the model. Among these are the patented dust separator which separates all dust, dirt, litter and abrasive material from the air before the air passes through the working parts. All this dirt is collected in an easily emptied metal container, operated by a foot lever.

ERRATA

In the article "What Price Molded Parts" on page 21 of the September issue, the last paragraph, column 3 in the sentence "those thoroughly familiar with cold molding practice" the word "cold" should be "good." Also, in the footnote shown with the table on page 21, in the sentence "In 500 M lots the 24 cavity hand mold—" the word "hand" should be "steam."—Editor

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* Illustration above shows sample book cabinet produced for The Holliston Mills, Inc.

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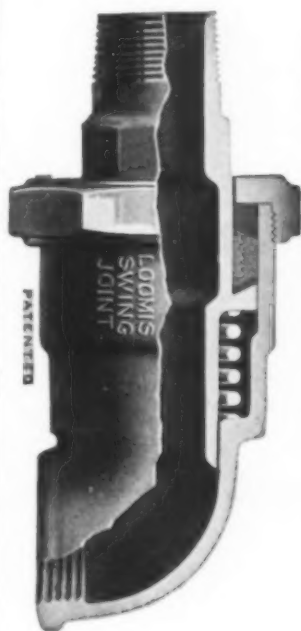
Complete line of Beetleware and Bellware in various colors.



STOCK BOXES

in various sizes and colors. Write for samples.

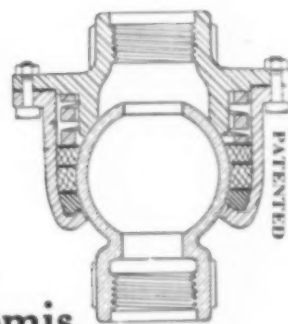
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OR

**FOSTER
BALL JOINTS**



GUARANTEED

Manufactured and Sold by

Evarts G. Loomis

126 So. 14th St.

Newark, N. J.



Asymmetrical desk of Swedish small-knot pine, aluminum, and white Micarta, with adjustable lamp. Designed for Mrs. Hugh Barclay, whose grandfather was among the founders of the Woolworth business

bedroom of Walter Winchell; and that in the apartment of M. Jean Despres, executive head of Coty & Cie, whose radio cabinet and private bar are here illustrated.

The showroom of Mme. Lilly Dache, Madison Avenue milliner, is the product of Mr. Sanders's design and shows ingenious use of plastics combined with metal and glass to create an effect of simple dignity and richness with great utility, convenience and comfort, as you can see in the two illustrations reproduced.

To clearly illustrate the intimate relationship between plastics and modern interior decoration, Mr. Sanders has drawn, exclusively for this article, two isometric sketches of opposing views of a man's combination bedroom and study, showing window walls of soft brown natural Bakelite which gives refreshing contrast with the walls opposite the windows which are painted white to reflect all possible light. Plastics, glass and metal are indicated for the furniture and bookshelves.

At the moment, Mr. Sanders is designing a new display room and "Bacardi" bar for Schenley Products Company.

IN THE FIELD OF DECORATIVE DESIGN

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up architecture as a profession he was not satisfied with the common tools and materials of the trade but sought out new combinations of available materials and converted them to strange uses, glass walls and plastics among them.

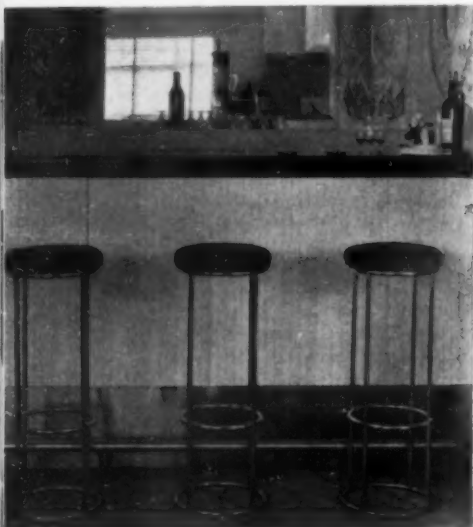
Then he became interested in decoration and soon found there was no available

source of modern furniture to his liking. This prompted the establishment of a small craft shop in which he could turn out the things he wanted in the manner he wanted them. Other decorators soon learned about this, and before long he was head over heels in the business of designing and building individual and distinctive pieces of modern furniture, lamps, and whatnot, for other decorators—"ghosting," as he calls it.

Among his first plastic designs were those executed for DuPont, through Ely Jaques Kahn, architect, and displayed at the Exhibition of Modern Decorative Art in the Metropolitan Museum in 1928. A toilet set of black Viscaloid with silver inlay, consisting of mirror, hair-brush and powder boxes. In the same exhibition was a bath room cabinet of veneered black Formica, also of his execution.

Furniture in the office of Raymond Moley, editor of the magazine *Today* was executed by Mr. Sanders. Also that in the

Private bar with Formica top and lacquered wood front, in the home of M. Jean Despres. Murals, also, are by Mr. Sanders



SUCCESS STORIES

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The watch has the standard Pocket Ben movement, contained in a special metal case that permits no powder to filter through to the works. The easel, which is packaged with the watch in a good-looking box, is a plated brass stamping. The price complete is \$2.95.

PROBABLE REASONS FOR SUCCESS:

Answering a need with unique finesse, the article could not help but click. Inquiries and sales followed immediately upon the heels of display. But it was the research made by Industrial Design, Inc. (who presented design and completed idea to the Western Clock Company) that uncovered the market and thus assured success. After that, it was necessary only to have the engineering design division of Western make small changes to begin manufacture well within the predetermined price limit.